

THE
ILLUSTRATED
GLOBE ENCYCLOPÆDIA
OF
UNIVERSAL INFORMATION.

EDITED BY

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VOL. I.

A—CANNA.

A. FULLARTON & CO
LONDON EDINBURGH, & DUBLIN.

1881.

PREFACE.

THOUGH several Encyclopædias of high reputation have already been issued in Great Britain, most if not all of which are seeking to keep themselves abreast of the age by new editions or extensive changes, yet it can hardly be doubted that a work which is untrammelled by the fetters of a previous issue has considerable advantages over its predecessors in regard to the treatment of all important topics. There must always be a temptation, even in the newest editions, to retain as much as possible of the old matter, when not absolutely incorrect in statements of fact, though the general conception of the subject may be faulty, or even antiquated. On the other hand, an entirely fresh work leaves an editor and contributors free to make the amplest use of the most recent research, and to give effect to that change in the relative proportions of things which time infallibly brings about. A new Encyclopædia, therefore, may be said to have a reason for its existence, if it honestly tries to avail itself of the natural advantages of its position. It is believed that in some measure the GLOBE ENCYCLOPÆDIA will be found to have done this. In offering the first volume for the consideration of the public, it may be thought necessary or desirable that the Editor should briefly state what kind of work has been projected, and in what particular way it seeks to win a place for itself.

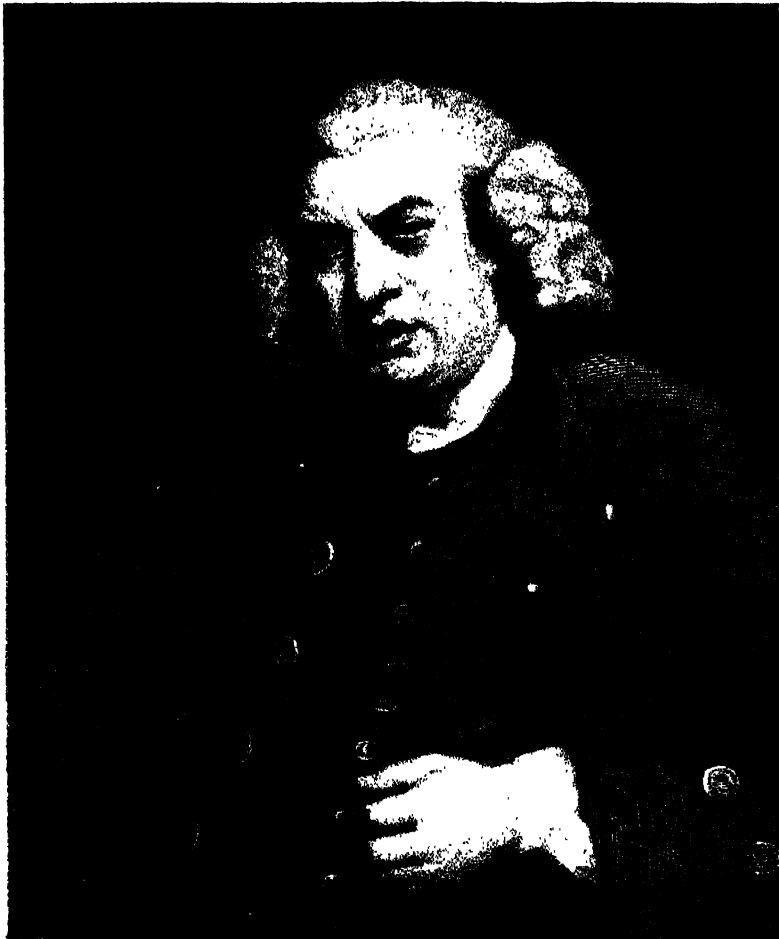
The time for elaborate and costly Encyclopædias, in the opinion of many, is gone by. Whether this be so or not, it is absolutely certain that there is an ever-increasing tendency on the part of the public to demand *the greatest amount of information in the smallest possible compass*. The necessity for knowing something of everything becomes more imperative every day. No man can now read a newspaper for any length of time without being brought face to face with a multitude of details about all questions of interest to the human race; and he is often unable to grasp the meaning of what he reads for want of additional knowledge or explanation. Much may not be necessary, but some is indispensable. This is what an Encyclopædia should give him. The more succinct the information, the better,—always assuming that the succinctness is not mere triviality and poverty. The editor of the GLOBE ENCYCLOPÆDIA has tried to produce a work from which superfluous elements should be strictly excluded, but which, at the same time, should embody the results of the most exact and careful research. Its limits make it, of course, impossible that an exhaustive treatment of subjects should be attempted, but it is hoped

that what is stated under any heading will in general be found clear, correct, and in harmony with the best knowledge or the best teaching on the point, so that readers, at any rate, shall not be misled, or need at some future time to unlearn and cast aside what they have acquired. In all the important parts of the work, the *GLOBE ENCYCLOPÆDIA* intends to carry out more thoroughly than any of its predecessors the practice of referring to authorities on the matters discussed or described. The meaning of names of places, &c., always interesting and often suggestive, has been given with a fulness, and, it is believed, with an accuracy, not hitherto aimed at. Although the articles, as a rule, are extremely condensed, it must not be supposed that no room has been left to present substantial information. A glance at the great departments of Geography, Biography, History, and General Literature, will show that the *GLOBE ENCYCLOPÆDIA* is designed to be as complete in treatment as much larger works. Whenever fresh and valuable statistics regarding foreign countries and great towns were obtainable from Consular reports or other sources, they have been used without stint. The Editor's previous experience has taught him where compression may be most judiciously exercised; and he believes that in five or six volumes he will be able to produce an *Encyclopædia* which, as a book of reference, will effectually serve the purpose of the public.

J. M. R.



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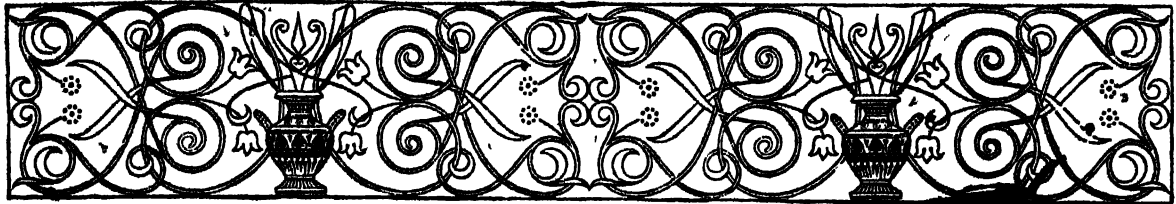
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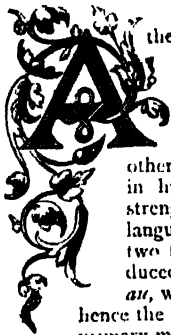
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 from the report by the Hon. Mr. General





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THE
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the first letter in nearly every alphabet, represents in English four distinct sounds, heard in *pale, pan, rather, gall*. The first of these is its name-sound in English, but the third is probably its original and proper sound, and is certainly that by which it is named in all other languages. It is the purest and fullest sound in human speech, and the element of greatest strength both in the earlier and later forms of language. By the combination of *a* with the other two fundamental vowels, *i* and *u*, have been produced in the Aryan tongues the diphthongs *ai* and *au*, which in turn have given rise to *e* and *o*; and hence the most delicate shades and modifications of the primary meanings of verbal roots. See ALPHABET.

A, the sixth diatonic, or the tenth diatonic-chromatic step of our modern scale starting from *C* as the key-note; and the note sounded by the third string of the violin, when open *A* used to be the lowest or first note of the scale, but by the addition of *G*, *F*, *E*, *D*, and *C*, it became the sixth of *C* major.

A 1. In Lloyd's Register (q. v.) this mark is appended to each British and foreign trading vessel whose original build and age entitle it to first-class rank; consequently to insure at lowest rates. The mark *A*, which indicates the first-class character of the ship itself, may be qualified by the figure *2*, to indicate that its gear is not first class in quality or quantity. The character '*A*' is assigned for a term of years with specific stipulations for periodical surveys, repairs, &c. The original period may be extended under certain conditions. When the letter is written in red, it indicates that the vessel is still fairly trustworthy for general merchandise and long voyages, but too old to be ranked as first class. '*Æ*' in black denotes a third-class vessel, good only for a short voyage; '*E*,' that the vessel is only fit for goods which cannot be injured by being made wet by the sea. '*I*' places the same limit on the vessel's carrying power.

Aa, a word probably of Celtic origin, but allied to the old Ger. *aha*, Gothic *ahva*, Latin *aqua*, and Sansc *ap* or *ab*, 'water.' It is, either with or without additions, the name of numerous rivers and streams in Germany, Switzerland, north-eastern France, Holland, the Baltic Provinces, and Denmark (where, however, *Aa* is pronounced *o*). In parts of Low Germany, such as Hanover, Holstein, &c., the form *Au* and *Aue* appears, while in High Germany the prevalent term is *Ach* and *Aach*.

As'ohen, the German name for Aix-la-Chapelle (q. v.)

Aal, the name of a red dye obtained from the roots of *Morinda citrifolia*, a small tree, native of Central India; it is used

in giving a permanent red colour to the native cotton cloth worn by the water-carriers of India, and to turbans.

Aal'borg (pron. Olborg, i. e., Eel-town), an important town in Jutland, with a fine haven, on the Lymfjord, about 13 miles from its mouth, the seat of a Lutheran bishop, has a public library of 16,000 volumes. Its manufactures, chiefly in leather, sugar, and tobacco, are rapidly increasing. *A.* is capital of a province of the same name. Pop. (1870) 11,721.

Aar, the largest purely Swiss river, rises in the glaciers of the *Grimsel*, and joins the Rhine at the village of Coblenz, after a course of nearly 200 miles. It passes Interlachen, Thun, Berne, Solothurn, and Aarau. While still a mountain torrent the *A.* forms the Falls of Handeck, 200 feet high.

Aargau (Fr. Argovie), a canton of Switzerland, so called from the river *Aar*, by which it is watered. The Rhine forms its north boundary, separating it from Baden. *A.* is a region of high hills and fertile valleys; rich in agriculture, with considerable cotton, silk, and leather industries. Area about 530 sq. miles; pop. (1870) 198,873, more than half being Protestant. The town is *Aarau*; pop. 5449. Near Schinznach, a town of *Aargau*, is the castle of Hapsburg (q. v.), from which the imperial family of Austria takes its name.

Aarhuus, the most important and populous town in Jutland, lies in a bay of the Kattegat at the mouth of the Mølle-Aa. It is the chief town of a fertile province of the same name, and the seat of a bishop, with one of the grandest Gothic cathedrals in the north. Fishing is the main industry; there are also considerable manufactures. *A.* had the first Christian church in Denmark. Pop. (1870) 15,025.

Aa'ron (Heb. *Aharon*, etymology uncertain), the elder brother of Moses, was a son of Amram and Jochebed. He belonged to the tribe of Levi, and is first mentioned in connection with the divine commission given to Moses to deliver the Israelites from bondage. Ever after he is a prominent figure, though his history shows him to have been more of an orator than a statesman. He is the chief miracle-worker at the court of Pharaoh; he strengthens the hands of his brother in the fight with Amalek; he is left to guide the people when Moses is hidden amidst the clouds of Sinai (when he proved a failure by yielding to the clamour for a return to the Egyptian idolatry), is soon after consecrated to the high priesthood, and is henceforth associated with his brother in the government of the wandering commonwealth. *A.* died, aged 123, at Mount Hor, on the southern borders of Idumæa.

Ab'aca, the name given in the Philippine Islands to a species of *Banana* (q. v.), *Musa textilis*, which yields Manila hemp, a

woody fibre obtained from its leaf-stalks, and imported into Britain for the manufacture of cordage.

Abacus was the name given by the Greeks to an instrument employed for purposes of practical reckoning by children, mathematicians, and astronomers. It is still used in China and Further India, and consists of a frame covered with parallel wires on which counters are strung.—A., in architecture, is the square or oblong tablet which rests on the capitals of columns, and was either rectangular, as in the Doric, Old Ionic, and Tuscan orders, or concave-sided, with acute angles, as in the New Ionic, Corinthian, and Roman.

Abaddon is a Hebrew word signifying the 'abyss' or 'under-world.' In Rabbinical tradition it denotes the lowest depth of Hades or Hell; but in the Apocalypse of St John (ix. 11) it is the name of the angel of destruction, who is represented as king of the demons that rise from the smoke of the bottomless pit.

Abaisé (Fr. 'lowered'), a term used in heraldry to denote that any armorial figure is placed below the centre of a shield. Other French terms have been borrowed by English heralds, as *affronté* (fronting one another), *adossé* (back to back), *aile* (winged), &c.

Abandon. The word has various legal significations corresponding to the popular meaning.

Abandonment, in marine insurance, is the giving up to the underwriter of all claim to the subject saved; the owner consequently requiring payment in terms of his policy. See **INSURANCE**.

Abandonment of Railways. 13 and 14 Vict. makes regulations for winding up of railway companies under warrant of the Board of Trade. See **RAILWAY**.

Abandoning or deserting seamen by captains of merchant vessels is a misdemeanour punishable by imprisonment. See **SEAMEN**.

Abandoning an Action. In Scotch law the 'pursuer' (i.e., plaintiff) may withdraw from an action on close of the record on paying expenses. After the judgment he cannot do so. In England the result is effected by a '*Nolle Prosequi*' in courts of common law. In the equity courts, either the plaintiff or defendant may move the 'dismissal' of the suit. See **ACTION**.

Ab'arim, or **Aborim**, the name of a mountain-range in Palestine east of the Dead Sea and the Lower Jordan, the most famous summits of which are Peor, Pisgah, and Nebo, from the second of which Moses surveyed the promised land, and on the last of which he died. From the language of Deut. xxxiv. 1, we may perhaps infer that Pisgah and Nebo were only separate peaks of the same mountain.

Abatement (Old French, *abatre*, to beat down). The word has various meanings in the law of England, mostly corresponding to its general meaning, as, 'to abate a nuisance'—to take legal steps to put it down; 'to abate an action'—to quash it by an objection, *ipso facto* fatal, as that the plaintiff is an outlaw. 'To abate into a freehold,' means to take possession without a title, to the wrong of the lawful heir.

Abatement, in heraldry, is a mark placed over part of the coat-of-arms of a family, and implies that the wearer has been guilty of some unworthy act. There are different marks for different kinds of offences, as rape, disloyalty, &c., but all are in either one or other of the two disgraceful colours, tawny and sanguine. Few heraldic authorities acknowledge these marks, which must not be confounded with others that denote real diminutions of dignity or rank, such as juniority of birth, removal from the principal branch of the family, &c.

Abat'tis, a kind of intrenchment, consisting of a line of felled trees (Fr. *abat'is*), with their branches pointed towards the enemy, whose advance it greatly impedes.

Abattoir (Fr. *abat're*, to fell), a slaughter-house. The use of the word has passed into England from France, where, by decree of Napoleon in 1807, public places, with proper sanitary arrangements, were first appointed for killing cattle. It was not, however, till 1818 that the use of private slaughter-houses was discontinued by the Parisian butchers. Abattoirs have been established in other towns in France, and in Brussels

and Mantua. In Great Britain there are now a good many; more would be required but for the fact that the meat supply of our towns is largely derived from cattle killed in the country. In London some of the old slaughter-houses still exist, under sanitary inspection. In Edinburgh an excellent abattoir was erected by the town council in 1851.

A Battuta. See **BATTUTA**.

Abau'zit, Firmin, savant and theologian, was born at Uzès in Languedoc in 1679, and died at Geneva in 1767. Though his parents were Huguenots, it was only by being sent to Geneva that he escaped an education into Catholicism, owing to the revocation of the Edict of Nantes. He was an eager and successful student, and in his twentieth year was intimate with Newton and Bayle. He aided in the French version of the New Testament (1726). His orthodoxy has been challenged, and his leanings seem to have been Unitarian. Rousseau has a fine *éloge* on him in the *Nouvelle Héloïse*. An imperfect edition of his works was published at London in 1773.

Abba, the Chaldaic form of the Hebrew word *ab*, 'father,' is used in the New Testament as a designation of God, but in ecclesiastical language has become a title of honour among men. In the Western Church, under the Latin form *abbas* (whence are derived the Fr. *abbé*, Eng. *abbot*, Ital. *abate*, Ger. *abt*), it officially denotes the ruler of a monastery, but among the Syrian and Coptic Christians it is given to bishops and patriarchs. In Abyssinia, however, the head of the Ethiopic Church is called *abouna*, 'our father,' while the simpler form A. is reserved for learned scribes.

Abbadie, Antoine-Thomson and Arnould-Michel d', born at Dublin, the first in 1810, the second in 1815, French explorers in Abyssinia from 1837 to 1845. Their papers contributed to the French Geographical Society bear specially upon questions of language and race. Antoine commenced in 1860 *Géologie d'une Partie de la Haute Ethiopie*. Arnould published in 1868 *Douze Ans dans la Haute-Ethiopie*.

Abandonnement's, a term in music denoting self-abandonment.

Abbas I, surnamed the Great, a Persian monarch of the Soffi dynasty, was born in 1557, and ascended the throne on the assassination of his brother, 1589. As a conqueror and governor his career was brilliant. In ten years (1590–1600) he subdued Ghilan, Mazanderan, Afghanistan, and part of Tartary. Then turning his arms against the Turks, who had long been fomenting discords in his western provinces, he inflicted on them a terrible defeat at Iassorah in 1605, and in the succeeding years extended his conquests beyond the Euphrates. In 1611 he dictated a treaty of peace to the Turkish Sultan Achmet I., by which the possession of Shirvan and Kurdistan was guaranteed to Persia. His fame now began to spread over Europe, and his court, which he fixed at Ispahan, was thronged with embassies both from eastern and western states. The envoys of the Great Mogul, and the lesser princes of India, encountered those of England, Russia, Spain, Portugal, and Holland. All were amazed at his splendour, and charmed with his hospitality, but none could forecast his policy. One of the later schemes of his life, the wresting of the isle of Ormuz (1622) from the Portuguese, by the help of the English, was the ruin of that island's prosperity. His domestic life was not a success. From distrust or jealousy he killed one son, put out the eyes of two others, and poisoned a number of his khans, in whose dying agonies he found a horrid pleasure. Remorse hastened his own end, which took place in his palace at Ferahabad, 28th January 1628. Abbas was an ardent Shi-ite, and worked astutely on the religious zeal of his countrymen, who, in consequence, venerate his memory, and believe that he even worked miracles.

Ab'basides, a Moslem dynasty which obtained the califate at Bagdad in 750 A.D., and held it till 1258 A.D., when it was overthrown by the Mongols. It takes its name from Abbas, the uncle of Mohammed, who for awhile was a strenuous opponent of the Prophet's pretensions, but after the battle of Bedr (624 A.D.), where he was taken prisoner, became a convert to the new religion, and used all his wealth and influence to make a party for Mohammed among the powerful tribe of the Koreish, to which they both belonged. A. died in 652 at the great age

of 86. Abul-Abbas, the great-grandson of Abbas, was the first of the Abbaside dynasty, and Motasem was the last.

Abbas-Mirza, a Persian prince, born in 1783, was the third son of the Shah Feth-Ali, but was preferred by his father to his two elder brothers, and his rights as heir-presumptive to the throne were guaranteed by Russia in the treaty of Gulistan in 1814. A soldier from his youth, he led the Persian troops in the disastrous campaigns against Russia of 1803, 1813, and 1826, in the second of which his enemies made themselves masters of the Caspian, and in the last of which they snatched from him Persian Armenia, over which he ruled as his father's viceroy. A treaty of peace followed (1828), and Russian envoys were sent to Teheran, but some of these being murdered in a popular tumult, A. was sent to St Petersburg by his father as a sort of hostage to prevent an outbreak of hostilities between the two countries. He was received with distinction, and returned to his own country loaded with presents. He died in 1833.

Abbate, Niccolo Dell, or Niccolo Abati, a painter, born at Modena in 1509 or 1512, died at Paris in 1571. His best known works—viz., the frescoes for the castle of Fontainebleau—were destroyed in 1738 in the course of some alterations on the building. A.'s influence is visible in the art of the latter half of the 16th c. Several artists of lesser note have sprung from the A. family.

Abbé, the French form of the Latin *Abbas*, originally denoted the ruler of a monastery, but since the concordat between Pope Leo X. and Francis I. (1516) its meaning has changed. That concordat secured to the French monarch the right to nominate 225 *Abbés Commendataires*, and, in consequence, many careless and idle youths of good family betook themselves to a clerical career, and drew the revenues of a benefice for which they did no spiritual work. After the middle of the 16th c. the title of A. was distinctively bestowed on all young ecclesiastics, whether in office or not. All, indeed, could not obtain benefices, and many had therefore to betake themselves to other careers. Not a few became tutors in great families, and in this capacity, when they happened to be men of spirit, intelligence, and taste, increased the appreciation of culture in the higher circles of society. Their influence in families, however, was not always wholesome or moral. In the French comedies of the time the A. often plays a not very edifying rôle. Others, again, more creditably sought distinction in science and literature, and thus a certain respect continued to be attached to the name. The Revolution of 1789 may be said to have abolished the A. as a distinctive feature of refined French society, and the title is now only given out of courtesy to young ecclesiastics.

Abbeville, a fortified town in the department of Somme, France, situated on the river Somme, about 12 miles from its mouth. It is badly built, and the streets are narrow; but it possesses one splendid building, the church of St Wolfran, begun in the reign of Louis XII. A. is connected by canals with Amiens, Paris, Lille, and Belgium; and small craft can sail to it up the Somme. Its chief manufactures are velvets, cottons, linens, hosiery, jewellery, and soap. Pop. (1872) 16,753.

Abbey. See MONASTERY.

Abbey, in a legal sense, denotes in Scotland the limits of protection to a debtor against legal process afforded by the A. of Holyrood. This privilege had, of course, its origin in the fact that churches were sanctuary and shelter to all who sought refuge within their walls. When the A. of Holyrood first became a secular refuge for the impecunious is not known. Buchanan is the first to record an instance—that of John Scott, A.D. 1531.

Abbate Grasso, a town of Italy, province of Milan, on the Bereguardo Canal, noted for its silk manufactures. Pop. 9177. At some distance north and north-west lie Buffalora, Magenta, and Turbigo, which acquired celebrity during the Franco-Italian war of 1859.

Abbot, from *Abbas*, the Latinised form of *Abba* (q. v.), originally denoted an aged monk, but after the 5th or 6th c. the name was given exclusively to the superior of a monastery. Down to the 10th c. he bore no other title. After that time, however, monastic orders multiplied in the Church, and many of the new monasteries chose new titles for their superiors, as

majors, priors, guardians, rectors, &c. The relation of the A., on the one hand, towards his order, and, on the other, towards the monks placed under him, varied considerably. Among the Benedictines, for example, he was elected by the convent, but after his election was absolutely independent, while in the Cistercian order his authority was subordinate to a bureaucratic court at Clairvaux. Before the monks were reckoned to, belong to the clergy, it was the duty of the A. to see that the rule of the order was observed, to administer the revenues of the monastery, and to compel the unqualified obedience of the monks. The Benedictines, however, possessed the right of appeal to the bishop of the diocese or to the Pope. From the 6th c. abbots have been ecclesiastics, and since the 2d Council of Nice (787) have been empowered to consecrate monks for the lower sacred orders. They are all prelates of the Church, have the same rank as bishops, and an equal vote in ecclesiastical councils. In the 8th and 9th centuries the dignity of A. began to be conferred by kings on laymen; the Carolingians, in particular, used to reward their faithful followers with abbasies. In the 10th c. many of the most important abbeys in Western Christendom were in the hands of laymen, who were called *Abba-comites* (count-abbots) and *Abbas milites* (soldier-abbots), and who kept the monastic revenues for their own use. In such case the spiritual and ecclesiastical oversight of the monasteries was intrusted to deans, priors, and vicar-abbots. The Frankish sovereigns bestowed monasteries freely on the members of their own families. Hugo Capet was lay-abbot of St Denis near Paris, and of St Martin at Tours. A great reform in monastic life took place in the 11th c. Towards the close of the middle ages, however, grave departures from the severe purity of the monastic rule became prevalent. A worldly spirit pervaded the abbeys. Princes claimed and exercised the right of election, and the offices were again bestowed on laymen who took no care of the spiritual condition of their monks. Abbots of this kind were called *Secular Abbots*, the vicars who discharged their duties, as well as all abbots belonging to the monastic orders, were called *Regular Abbots*. In those countries that adopted the Reformation—such as Germany, Switzerland, England, Scotland, &c.—the revenues of the monasteries were, as a rule, wholly confiscated by the rulers, and shamefully misappropriated. The evils resulting from a secularising spirit in those countries that retained the ancient faith are visible enough in the concordat between Francis I. and the Pope. See ABBÉ. Italy has recently secularised monastic property, but is devoting it largely to national education. There are monasteries in the Greek Church also whose superiors are called *Higumeni* or *Mandrites*, and their abbots-general, *Archimandrites*.

Abbot, George, English prelate, was born at Guildford in 1562, and educated at Oxford. He attracted the notice of King James I. by his zeal and prudence in the mission of the Earl of Dunbar (1608) for bringing about a union between the Churches of England and Scotland, and was successively created by him Bishop of Lichfield and Coventry, 1609; Bishop of London, same year; and Archbishop of Canterbury, March 1610-11. Having accidentally shot a keeper, while hunting, in 1622, a commission was appointed to examine whether this incapacitated him for his duties. Its decision was favourable to A. As an opponent of the despotic policy of Laud and the court, he was for a time out of favour with Charles I. A. had a share in the translation of the New Testament in 1604, and wrote several theological works. He died in 1633.

Abbotsford, the seat of Sir Walter Scott, in Roxburghshire, about three miles west of Melrose, where Gala Water falls into the Tweed. In 1811 Scott here began his great territorial scheme by the purchase of one hundred acres of bleak moorland, full of historical association, substituting the name A. for that of *Clartey Hole*. The castle was built at various periods, at a cost of not less than £20,000, and has been happily described as 'a romance in stone and lime.' The present proprietor is the Hon. Joseph Constable Maxwell, son of Lord Herries, who in 1873 married the poet's great-granddaughter, and took the name of Scott.

Abbott, Charles. See TENTERDEN, LORD.

Abbott, Rev. Jacob, a voluminous writer for the young, was born in Maine, United States, in 1803. His works, which are full of simplicity, earnestness, and interest, have been fre-

quently republished, and some have been translated into various European and even Asiatic languages. The best known is *The Young Christian*. Among the others are, *Histories for the Young*, 19 vols.; *Histories of Celebrated Persons*, 30 vols., &c.

Abbreviations are in use among all nations who write, and have been so from very early times. They are of two kinds—first, A. consisting in the omission of letters or words; and second, A. consisting in the substitution of signs. The former are the older of the two, and their employment goes back to the period when uncial characters alone were used. It was then customary to shorten syllables, words, phrases, &c., as one may see from inscriptions on monuments, coins, &c. The most familiar instance of this mode of abbreviation is making the initial letter of a word do duty for the whole, as when P. stands for Publius. After the invention of the small Greek and Roman letters, particular signs of A. were introduced to represent syllables, double consonants, double vowels, and words. From Greek manuscripts the signs found their way into printed editions of Greek books, and it is only of late years they have been wholly abandoned. The Roman A. were very numerous. L. Annæus Seneca classified 5000 of them. They increased in number during the middle ages, and continued to be used long after printing had rendered them unnecessary. Deciphering these A. requires careful and patient study, and has given birth to a science called Diplomatic (q. v.) In England, since the reign of George II., the use of A. has been forbidden in all legal documents. In one or other of their two forms, however, they are still employed in philosophical works. In particular sciences, as mathematics, astronomy, physics, chemistry, natural history, grammar, and music, in which certain signs have obtained a definite technical meaning (see MATHEMATICS, PLANETS, &c.), and in publications in which it is of essential moment to save space, e.g., lexicons, encyclopædias, bibliographical works, &c. Besides these, there are certain groups of A. which are conventionally used, and which have so strongly established themselves that you hardly ever see the words written in full. Thus the forms Mr and Mrs (for Master and Mistress) are invariably employed before the names of persons. To the same class belong Christian names, titles, and terms used in indicating time, the marks for coins, weights, and measures, citations from books in general use or widely known, such as the Bible or the Corpus Juris.

Abd, in Arabic, means 'slave,' or 'servant,' and, along with the name of God, enters into the composition of many names in use among the Moslems, e.g., *Abd-Allah*, 'servant of God'; *Abd-el-Kader*, 'servant of the mighty God'; *Abd-ul-Latif*, 'servant of the gracious God'; *Abd-ur-Rahman*, 'servant to the merciful God.' The Hebrew and Syriac form is Ebed, which in the same way enters into the composition of Jewish and Christian names.

Abd-el-Kader, born in 1807 at Ghetna, near Mascara, a man of a lofty, intrepid, and tenacious character, distinguished himself by his determined resistance to the French arms in N. Africa. His father had great influence with his countrymen, both from his high lineage and his personal sanctity, an influence which his son inherited. A.'s intelligence, morality, humanity, and devotion to his own faith, without a trace of intolerance, marked him out as fitted to act an important part in the history of his country. The Turkish power being broken by the French conquest of Algiers (July 1829), the Arab tribes of Oran made A. their emir, and he was soon at the head of 10,000 cavalry. Two sanguinary battles, December 3, 1833, and January 6, 1834, obliged General Desmichels to conclude a treaty with him, and his power was acknowledged in Oran and Tîteri. On June 28, 1835, he was strong enough to inflict a signal defeat on General Tretzel. But the French gradually obtaining the mastery, in 1841 A. had to seek shelter in Morocco, which thus incurred the enmity of France. A. twice attacked the French, in October 1845, and in March 1847. Having failed in an attack on the Moorish camp, he secured his retreat into Algeria, where most of his followers gave themselves up to the French, and on December 22, 1847, he had himself to surrender. He was sent to Toulon, and after two further changes of residence, was liberated by Louis Napoleon in 1852. He resided first at Brussa, then at Constantinople, and finally settled at Damascus, and was the means

of saving many lives during the Syrian massacres of 1860. He visited France and England in 1865, and was again in France in 1867, at the time of the Paris Exhibition.

Abdication, the act of giving up office; usually, however, the word is only applied to resignation of sovereignty. In some countries the sovereign can abdicate whenever he pleases, but in England it is held that the king or queen cannot abdicate without the consent of Parliament. Abdication of the sovereign may, however, be presumed in England, and acted on by the people, if his conduct is inconsistent with the established system of constitutional government. Thus the word 'abdicated' was advisedly used instead of 'deserted,' with reference to the departure of King James II., at the conference between the two Houses of Parliament, previous to the passing of the Act which settled the crown on William III. and Mary—the meaning being that the king had not only deserted his office, but that, by his acts, the desertion included, he had forfeited his right to the throne. The Scotch Convention, however, resolved that King James had 'forfaulted' (forfeited) the crown. The following are some of the most remarkable abdications of sovereignty: The Roman Emperors Diocletian and Maximian, A.D. 305; Emperor Charles V., 1556; Louis Bonaparte, King of Holland, 1810; Napoleon Bonaparte, 1814 and 1815; Charles X., King of France, 1830; Louis Philippe, King of the French, 1848; Amadeus, King of Spain, 1873.

Abdomen. The trunk is divided into two compartments by a muscular partition called the diaphragm. The upper compartment is termed the chest or thorax, the lower the abdomen. The abdomen extends from the diaphragm above to the floor of the pelvis below, and is subdivided into two parts: the upper and larger part, the abdomen proper, and the lower the pelvis. See PELVIS. The abdomen proper contains the stomach, the liver, the pancreas, the kidneys, the supra-renal capsules, the spleen, the omentum, and small and large intestines, with the exception of the last part of the great intestine termed the rectum, and blood-vessels. It is lined by a thin serous membrane called the peritoneum, which sends reduplications over the various organs.

Abdominales, a Linnæan order of fishes, including those species which have the pectoral placed before the ventral fins, or upon the abdomen, the cartilaginous fishes being excepted. Naturalists, however, now apply the term only to the family or subdivision of Malacopterygious or soft-finned fishes, including nearly all the fresh-water species, and such as periodically migrate from the sea to the rivers to deposit their spawn, such as the salmon, trout, herring, pike, &c.



Pike

Abduction means, in the criminal law of England, the unlawful taking away of a female, and the use of the word is commonly restricted to this; although under the Jewish and according to civil law the word is also applied to the illegal taking away of males. A. may either be by force or fraud.

1. **Abduction of Child**.—It is provided by 24 and 25 Vict., that if any one shall unlawfully, by force or fraud, lead or entice away any child under the age of fourteen with intent to deprive the parent or other lawful guardian of the custody of the child, or with intent to steal any article on its person, or shall with such intent harbour the child, knowing it to have been stolen, he shall be held guilty of felony, and shall be liable to penal servitude for seven years; if the offender be a male under sixteen, he is liable to be whipped. It is a misdemeanour subject to two years' imprisonment to take or decoy out of the lawful guardian's possession an unmarried girl under sixteen.

2. **Abduction of Wife**.—Formerly, in England, the husband had in this case a claim for damage against the male offender, who was also liable to two years' imprisonment, and to be fined at the pleasure of the crown. Now, under the statutes relating to divorce and matrimonial causes, the marriage may be annulled,

with, in case of the wife's adultery, damages from the adulterers, or the husband and wife may be 'judicially separated.'

3. *Abduction of Ward or Pupil.*—In England a guardian is entitled to bring an action against any one taking from him the custody of his ward or pupil; but the proper remedy is by application to the Court of Chancery, to which court belongs the supreme guardianship of all the infants in the kingdom. In Scotland a similar jurisdiction is exercised by the Court of Session.

4. *Abduction of Women.*—The statute 24 and 25 Vict. makes it felony to take away any woman against her will, or by fraud, with intent to marry or violate her, or to cause her to be married or violated; and when a woman is abducted who is an heiress, expectant or in possession, and marriage is the result of the abduction, the husband forfeits all right and interest in the property which would otherwise have come to him by marriage. To aid or abet in the abduction of a woman is also by the above statute rendered felony.

It is an offence against the statute to take a female natural child from the custody of its putative father. The operation of the statutes extends to Ireland.

Abd-ul-Hamid-Bey, a French traveller, whose real name is Du-Couret, born at Huningue, Alsace, in 1812. In 1834 he departed for Egypt, ascended the Nile into Abyssinia, and returned to Cairo along the W. coast of the Red Sea. Here he embraced Islamism, took an Eastern name, made the pilgrimage to Mecca, traversed Arabia, and landed sick and exhausted on the island of Bourbon. Thence, in 1846, he repaired to Persia, where he was thrown into prison, but returned to France in 1847. In 1849 he explored N. Africa, the results of which are given in a *Memoire à Napoleon III.*, Paris, 1853. His earlier wanderings are described in *Mémoires et Mémoires*, 3 vols., Paris, 1855.

Abd-ul-Latif, a learned Arabian, born at Bagdad in 1161, and died there in 1231. He completed his education in Mohammedan literature at Damascus, where Saladin had collected the first scholars of the age. Thence he proceeded to Egypt, where he became acquainted with the famous Maimonides. Medicine now became his principal study, more than a half of the 136 works ascribed to him relating to this science; but he also wrote a valuable description of Egypt, translated into Latin by White of Oxford in 1800, and into French by De Sacy in 1810.

Abd-ul-Medjid-Khan, thirty-first of the Ottoman sultans, was born 6th May 1822, and succeeded his father, Mahmud II., 1st July 1839. His accession to the throne occurred at a critical condition of the empire. A few days before the Turkish army had been routed by the Egyptians, led by Ibrahim Pasha, and only the intervention of the great European powers prevented Mehemet Ali, Viceroy of Egypt, from overthrowing the Ottoman dynasty. The sagacious counsels of Reshid Pasha tended much to restore and confirm the authority of the government. Judicious reforms were instituted, and religious equality, partially declared in the hatti-sherif of 1839, was formally proclaimed in 1850. His attitude during the Crimean war was not heroic; but his soldiers fought with enthusiasm for a monarch who kept his seraglio in the presence of the foe. Yet on several occasions A. acted, at great risk to his own interests, with admirable spirit and resolution against foreign dictation adverse to the claims of freedom and humanity. The case of Kossuth will not soon be forgotten. A. died 25th June 1861.

Abd-ul-Mumen. See ALMOHADES.

Abd-ur-Rahman. See OMMADES.

Abel (Heb. *Hēbel*, 'breath,' 'vanity,' probably so named from the shortness of his life) was the second son of Adam. He was a shepherd, and was slain by his elder brother Cain because his offering was accepted by Jehovah, and that of Cain rejected. No reason is assigned in the original narrative for this preference, but in the New Testament (Heb. xi. 4) it is explained that A.'s sacrifice was made more excellent by 'faith,' an opinion which has been generally adopted by the Christian Church. Some theological scholars consider the story only the fragment of an older and more complete tradition.

Abel, Karl Friedrich, an accomplished performer on the *Viola da gamba*, born at Koethen in 1719, was a pupil of Bach. In 1758 he came to England, and was made chamber-musician

to the queen of George III. His merits as a composer were never great, and are now forgotten. He died in 1787.

Abelard (in the oldest MSS. *Abailard*), Pierre, an illustrious scholastic philosopher and theologian, was born in 1079 at Palet or Palais, a village near Nantes in France. After a youth marked by an insatiable thirst for knowledge, he went to Paris at the age of twenty, and became first a disciple and soon after a rival of Guillaume de Champeaux, surnamed the 'Pillar of Doctors,' and head of the great episcopal school in that city. A. next established himself as a philosophical lecturer at Melun (1102), and then at Corbeil, and finally, in 1113, at Paris, where he obtained the chair of his former master. At this moment his reputation was immense. Paris idolised him. From the most distant regions, Rome, England, and Germany, students hastened to listen to his eloquent and impassioned logic. Poet and musician, as well as philosopher, he wrote songs in French for his students, and won the love of a woman whose grace was irresistible, for she charmed even St Bernard himself. This was the niece and ward of Fulbert, canon of Notre Dame, a lady celebrated for her beauty, wit, and elegance. A. became her teacher and companion, and the pair soon learned to love not wisely, but too well. When it became for Heloise impossible to conceal her frailty any longer, A. carried her into Brittany, where she gave birth to a son, who received the curious name of Astorjabe. A secret marriage followed, but the uncle was not satisfied, and when A. removed her to the monastery of Argenteuil, Fulbert in revenge hired some wretches to emasculate the rash lover, and thereby incapacitate him for ecclesiastical preferment. After this inexpressible outrage, A. became a monk in the abbey of St Denis, and Heloise a nun at Argenteuil. His disciples asked him to resume his lectures, and his popularity became greater than ever. But a council held at Soissons in 1121 condemned his opinions on the Trinity as heretical, and soon after he withdrew to Nogent-on-the-Seine, where he built an oratory, and named it the Paraclete, or Comforter; thence he passed into Brittany, where it is thought he wrote his singular book *Sic et Non*, first published by M. Cousin, and consisting of arguments for and against the principal doctrines of the faith, culled out of the Church fathers. But St Bernard could not pardon him for vindicating the rights of reason against blind submission to authority, and in 1140 the Pope again condemned him as a heretic to perpetual silence. Two years after (April 21, 1142), A. died in the abbey of St Marcel, near Chalons-sur-Marne. Heloise, who had succeeded him at the Paraclete, and survived him twenty years, received his corpse. The ashes of both were taken to Paris in 1808, and are now in the Père la Chaise. A. had a great respect for the human intellect, and thought nothing credible that could not be understood. He was a superb dialectician, and the most brilliant orator of the schools in his own age. The principal editions of his writings are those of Paris (1616), Oxford (1728), Turin (1841), and that of Cousin (Par. 1850). See also *Lettres d'Abailard et de Heloise*, translated from the Latin, with an essay by M. and Madame Guizot (Par. 1837); Cousin's *Ouvrages inédits d'Abailard* (Par. 1836); and Rémusat's *Abelard* (Par. 1845).

Abele-tree. See POPLAR.

Abelmoschus, a genus of plants of the order *Malvaceæ* (q.v.) The name, which is derived from the Arabic, has reference to the odour of the seeds of some species, which resembles musk, and is accordingly used to perfume pomatum. *A. esculentus* furnishes the ochro gombo or gombo pods used for food in the E. and W. Indies. The young fruits are also used like capers. Different species of A. yield a strong and durable fibre, and abound in mucilage.

Abencerages figure in the old Spanish chronicles and romances as a noble Moorish race in Granada, who were at feud with the family of the Zegrís, were allured into the Alhambra, and murdered there in the time of Abu-Hassan, about 1460. This tale first acquired celebrity in literature through a picturesque historical romance, entitled *Historia de las Guerras Civiles de Granada*, by G. Perez de Hita (1595-1604, Madr. 1833 and 1846), which is the basis of Chateaubriand's *Les Aventures du Dernier Abencerage*.

Aben-Esra, the most learned rabbin of the middle ages, was born at Toledo, in Spain, 1088-89. He travelled in various countries, but in his later years lived in Rome, though he died at

Calaharra, in Spain, 1176. A. was a mathematician, astronomer, philosopher, poet, physician, theologian, and grammarian—a perfect encyclopædia of learning, and the whole of his vast resources were devoted to the elucidation of Scripture. His commentaries on the Old Testament literature are a curious mixture of rationalistic criticism, intense piety, and ardent faith in revelation. He doubts the genuineness of parts of the Pentateuch, believes in a 'younger' Isaiah who wrote the latter part of the work that goes under that prophet's name, accuses the Chronist of blundering, declares the history of Jonah a dream, and denounces free inquiry as heretical! Yet in spite of such contradictions, A. is an admirable commentator, and was the first biblical scholar that raised exegesis to a science. Many of his works have been printed during the last two hundred years.

Abeoku'ta, a cluster of villages forming the capital of the Egba territory, on the W. coast of Africa, about 80 miles N. of Lagos, and 240 W. of the Niger. The mud wall which surrounds these villages is nearly 20 miles in circumference; the houses themselves are also built of mud, with high thatched roofs. There is said to be a total population of 150,000. The chief trade is in palm oil and grain.

Aber, a Celtic word, essentially the same as *Inver*, denoting the confluence of waters, either of two rivers or of a river with the sea. It originally existed both in the Gaelic and Cymric branches of Celtic, and examples can be found in all the dialects; but in Gaelic it died out at an early period, and *Inver* became more common. In Wales and Brittany, on the other hand, *Inver* became obsolete, and only A. survived, hence the frequency of the name in these countries.

Aberavon or Port-Talbot, a parliamentary and municipal borough in Glamorganshire, Wales, about 30 miles W. of Cardiff, and a mile above the mouth of the Avon, which flows into Swansea Bay. It is a station on the South Wales Railway. The great works at Cwm Avon, in the neighbourhood, comprising collieries, iron-works, copper-smelting, tinplate, and charcoal works, are among the largest in Wales, and are the main cause of the prosperity of the town. The port was greatly improved in 1838. Pop. in 1871 of the municipal borough, 3574; of the parliamentary borough, 11,906.

Abercrombie, John, M.D., an eminent Scottish physician and philosopher, was born at Aberdeen in 1781. He studied medicine and took his degree at Edinburgh, where he also devoted himself to the practice of his profession, soon attaining a great reputation. He wrote several professional works of considerable worth, but his celebrity is chiefly connected with his *Inquiries respecting the Intellectual Powers* (1830), and *The Philosophy of the Moral Feelings* (1833). In these works he has applied his medical experience to mental and moral philosophy, producing books of great interest and value, if not marked by much depth or originality. Dr A., who was also eminent for his genuine and unassuming piety, died in 1844.

Abercromby, Sir Ralph, K.B., a celebrated British general, was born at Menstry, in Clackmannanshire, in 1734. He entered the army in 1756, and by 1787 had attained the rank of major-general. In 1793 he accompanied the Duke of York to Holland, where his bravery in the field, and his humanity in the disastrous retreat of 1794-95, won universal admiration. In 1795 he was appointed to the chief command in the West Indies, where he quickly took from the enemy, in little more than a year, the islands of Grenada, Trinidad, St Lucia, and St Vincent, besides part of the mainland of Guiana. For a short time during the Irish rebellion he was commander-in-chief in Ireland, but on expressing his dislike to the service, was removed to a similar post in Scotland. He accompanied the Duke of York in his second unfortunate campaign in Holland in 1799, and distinguished himself as before by his bravery and skill. The last service of this gallant officer was in command of the expedition sent against the French in Egypt. Early in March 1801 he landed his forces in the Bay of Aboukir, successfully encountering the troops that opposed him. On the 21st of the same month the whole French army attacked his lines, but was completely defeated. A., however, was mortally wounded during the engagement, and died a week afterwards.

Besides his fine qualities as a soldier, A. was an able and accomplished man, of a most attractive personal character.

The British Government erected a monument to his memory in St Paul's Cathedral, and his widow was created Baroness Abercromby, with a pension of £2000.

Aberdeen, the capital of the county of A., and principal seaport in the N. of Scotland, at the mouth of the river Dee, about 111 miles N. of Edinburgh. It was made a royal burgh (1179) by William the Lion, but its present privileges are founded on a charter granted by Robert Bruce in 1319. The town was burned by the English in 1336, and on being rebuilt was called New A. Old A. is a small town a mile N., within the same parliamentary boundary. A. had formerly two universities, King's College and University in Old A., founded by the good Bishop Elphinstone 1494, and Marischal College and University in the new town, founded by Keith, Earl Marischal, 1593; but in 1860 they were merged in one, called the University of A., which in 1873-74 had 624 students. Its general council, with that of Glasgow University, returns one member to Parliament. The University of A. is distinguished for the thoroughness of its Latin scholarship, and can boast of many illustrious names both in literature and philosophy. Its two grammar-schools are also justly celebrated. During the last half century the 'granite city,' as it is called, from the material of which it is mainly built, has been greatly improved; the harbour has been enlarged, and a pier 1200 feet long has been erected. The total registered shipping of the port in 1874 amounted to 103,149 tons. The chief exports are linens, wools, cotton yarns, granite, grain, and fish. A. has considerable shipbuilding and iron trade, and the largest comb and granite-polishing works in the kingdom. Pop. in 1871, of municipal burgh, 76,348; parliamentary burgh, sending one member to Parliament, 88,125.

Aberdeenshire, a maritime county in the N.E. of Scotland, bounded N. and E. by the North Sea, W. by the counties of Banff and Inverness, and S. by the chain of the Grampians; between N. lat. 56° 52' and 57° 42', W. long. 1° 49' and 3° 48'. It is 102 miles long, and attains a breadth of 50; area, 1980 sq. miles, with 60 miles of sea-board. In point of size it stands fifth among Scottish counties, and third in respect of population. The most notable of its old historical divisions were Mar, Buchan, Garroch, and Strathbogie. The 'Buchan dialect' is a form of Lowland Scotch surcharged with Scandinavianisms. A. is in great part mountainous, well watered, and towards the N. has a rich loamy surface. The highest mountains, all in the S.W., are Ben-Muic-Dhui, 4296 feet; Cairntoul, 4245; Cairngorm, 4090; Ben-na-Buid, 3860; and Lochnagar, 3786. The rocks are chiefly granite, gneiss, and mica slate. The principal rivers are the Dee (96 miles long), Don (78), Doveran (58), and Ythan (37); they all run N. or E. into the North Sea. The coast-line is regular, but occasionally precipitous; in some parts cliffs 200 feet high overhang the sea. With a soil of ordinary character and a severe climate, A. is remarkably productive, fully 36 per cent. of its entire surface being cultivated. Its forests yield the finest fir timber in Great Britain, and it is unexcelled in Scotland for the rearing of cattle. There are 188 miles of railway, and the public roads, which are excellent, are maintained by rates instead of tolls. A. sends two members to Parliament. Pop. in 1871, 244,603; and, excluding the burgh of A., the value of real property (1873) amounted to £798,191. There are nearly 300 churches, almost equally divided between the Established and Free; and 84.83 per cent. of the children under thirteen years of age attend school.

Aberdeen, George Hamilton Gordon, Earl of, was born in Edinburgh in 1784, and educated at Harrow and Cambridge. He entered public life in 1806 as one of the representative peers of Scotland. Sent as ambassador to Vienna in 1813, he succeeded in bringing over Austria to the alliance against France, and in 1814 was created Viscount Gordon. In the Duke of Wellington's ministry, 1828-30, he held the office of foreign secretary; in the brief administration of Sir Robert Peel, 1834-35, he was colonial secretary; and from 1841 till 1846 he filled his old post of foreign secretary under the same leader. During the last period he carried through the famous 'Aberdeen Act,' which neither hindered the disruption of the Scotch Church, nor gave satisfaction to those for whom it was meant, and which is now virtually repealed by the 'Act for the Abolition of Patronage' (1874). A. was placed at the head of the

coalition ministry formed in 1852, but dissatisfaction with his management of the Crimean war caused his retirement in 1855. He died at London, 14th December 1860. The distinguishing feature of Lord A.'s career was the gradual paling of an early Toryism into a very liberal Conservatism; and of his policy, non-intervention in the internal affairs of other nations. He is known as an author by an *Essay on Grecian Architecture* (1822).



Aberdevine.

Aberdevine, more generally termed the Siskin (*Carduelis spinus*), a small migratory song-bird allied to, but smaller than, the goldfinch. In the S. of England it is called the barley-bird, as it is usually a visitant about the barley-seed time. When kept as a cage-bird, it crosses freely with the canary, the green variety of which it somewhat resembles.

Abergavenny, pron. **Abergann'y** (the *Gobanium* of the Romans), is a town of Monmouthshire, picturesquely situated amidst wooded hills in the valley of the Usk, about 13 miles from Monmouth, at the confluence of the Usk and the Gavenny. A. has a large trade in wool, but there are also numerous collieries and iron-works in the neighbourhood. A notable feature of the place is the Cymreigyddion Society, established for the promotion of Welsh literature and the Welsh industrial arts. Pop. (1871) 4803.

Abernethy, John, one of the most distinguished of English surgeons, was born in 1763 or 1764. He was apprenticed in 1780 to Mr (afterwards Sir Charles) Blinck, surgeon at St Bartholomew's Hospital, where he became assistant-surgeon in 1787. The lectures which he began to deliver at the hospital soon after this were extraordinarily popular. In 1813 he was appointed surgeon to Christ's Hospital, and in 1814 Professor of Anatomy and Surgery to the College of Surgeons. His death took place at Enfield in 1831. A. has the honour of first enunciating and establishing the great principle—completely revolutionising the whole field of surgery—that local diseases are symptoms of a disordered constitution, not primary and independent maladies, and to the exposition of this is devoted his principal work, *Observations on the Constitutional Origin and Treatment of Local Diseases* (1806). He was distinguished by a blunt eccentricity of manner, regarding which many anecdotes are narrated.

Aberrant, in botany, means something which differs from ordinary structure of related group of plants; thus, a natural order may be A. by being intermediate between two other orders.

Aberration of Light is an apparent displacement of a star from its true position, arising from the combined velocities of the earth in its orbit and the light emitted from the star. This phenomenon is analogous to the apparent obliquity of a perpendicular shower of rain to a person in rapid motion; and is obviously dependent upon the law of the composition of velocities. See **VELOCITY**. Hence the line drawn from the star's apparent position at any instant to its true position represents in direction and magnitude the velocity of the earth in its orbit at that instant; so that the star seems to describe, in the course of a year, the Hodograph (q. v.), or projection of the hodograph, of the earth's orbit. Therefore, in consequence of A., each star describes a circle, whose plane is parallel to the plane of the ecliptic. Accordingly all stars, with but few exceptions, appear to describe ellipses, whose major axes are equal. A. was discovered in 1727 by Bradley, who fixed the major axis at about 40".

Aberration in Optics is the deviation, after reflection from a concave mirror, or refraction through a convex lens, of the rays of a pencil of light from that point in the axis of the pencil known as the principal focus of the mirror or lens in question. In the lens this is due to two causes—viz., the spherical form usually given to the lens, and the different degrees of refrangibility possessed by the different coloured rays of light—which give rise respectively to Spherical A. and Chromatic A..

Aberystwith, a seaport of Cardiganshire, S. Wales, and one of the Cardigan parliamentary boroughs, is situated at the mouths of the rivers Ystwyth and Rheidol. Sheltered from the E. by a hilly background, which overlooks the wide expanse of Cardigan Bay, it has become the most fashionable bathing-place in Wales. A large building, intended as a national Welsh college, has been recently erected here, but it has not prospered. In 1872, 320 vessels, of 18,316 tons, entered the port. Pop. (1871) 6898.

Abeyance, an English law term, implying that a freehold inheritance, dignity, or office is not vested in any one. In the law of Scotland the principle is that the 'fee,' or right of possession, of tangible property must be vested in some one. In both countries titles of honour and right to office may be in abeyance, or 'dormant.'

Abies, a genus of coniferous trees. See **FIR**.

Abingdon, a town in Berkshire, 6 miles S.W. of Oxford, and 56 N.W. of London. It is as old as the time of the Britons, and became the seat of a monastery in 680, which was destroyed by the Danes in 871, and rebuilt as an abbey in the reigns of Edgar and Canute, whence the town was called Abbandune or Abbandon, 'the town of the Abbey.' In 1645 Lord Essex held it successfully against Charles I., and put every Irish prisoner to death without trial; hence the phrase, 'Abingdon law' (like the Sc. 'Jeddart justice'). A. has manufactures of woollens, carpets, sacking, &c.; corn and cattle markets; and sends a member to Parliament. Pop. (1871) 6571.

Abington, a township of Massachusetts, United States, 20 miles S.E. of Boston, with manufactures of boots, shoes, and nails. Pop. (1870) 9308.

Abjuration, Law of. See **ABJURATION OATH**.

Abjuration, Oath of. Formerly three oaths, called the Oaths of Allegiance, Supremacy, and Abjuration, were required from all persons before admission to any public office, but by 21 and 22 Vict. one oath was substituted for the three. By it allegiance was sworn to the Queen and fidelity to the Act limiting the succession to the crown, while all foreign jurisdiction, civil or ecclesiastical, was abjured 'within this realm.'

By 31 and 32 Vict., however, this form of oath was abolished, and three other forms of oath established. These are called—1st, the oath of allegiance; 2d, the official oath; and 3d, the judicial oath. Some officers require to take the oath of allegiance and the official oath, and some others the oath of allegiance and the judicial oath. The oath of allegiance is as follows: 'I, A. B., do swear that I will be faithful and bear true allegiance to her Majesty Queen Victoria, her heirs and successors, according to law. So help me God.' Most of the other statutes regarding oaths were repealed by the statute 34 and 35 Vict. There is not now, as formerly, any special form of oath required from Roman Catholics; the above-quoted oath of allegiance being the form prescribed for members of all religious persuasions, and for the whole of the United Kingdom. The oath of homage taken by ecclesiastical dignitaries was not affected by the statute 31 and 32 Vict.

Ablative Case. See **DECLENSION**.

Abnormal denotes in botany a deviation from normal condition. Stamens standing opposite to petals are A., it being customary for stamens to alternate with them. In the European lime-tree the flower-stalk is adherent to the midrib of a bract, and is therefore A.

Abo (pron. *Obo*), a town in the Russian government of Abo-Björneborg, Finland, situated in the Gulf of Bothnia, near the mouth of the river Aurajokki. The Swedes founded it in 1157, and it remained theirs till the *Peace of Abo* (1743), when it was annexed to Russia. In 1827 the university, with its fine library, was destroyed by fire, and the institution was afterwards removed to Helsingfors, which since 1819 has superseded A. as the capital of Finland. Pop. (1870) 19,793.—The government of Abo-Björneborg has an area of 9450 sq. miles, and a pop. (1870) of 306,331.

Abolitionists, a name used in the United States to designate a class of political philanthropists who sought by means of literature and popular oratory to destroy the institution of slavery. They are as old as the Republic itself. The first Pennsylvania

abolitionist society was formed in 1775, with Benjamin Franklin for its president. Similar associations were soon formed all over the North, but strenuous and organised opposition to slavery was first begun by Lloyd Garrison in his *Liberator*, started 1st January 1831. The exigencies of the civil war compelled the Republican party to adopt the creed of the A., and on the 1st of January 1863, President Lincoln proclaimed the emancipation of the negro, and the long agitation of the party came to an end. It expired in the moment of victory.

Abo'mey. See DAHOMEY.

Aborigines, a name generally used to denote the earliest (Lat. *ab origine*) inhabitants of a land, like the Gr. *autochthones*, though the latter term strictly signifies sprung from the soil. In the half-fabulous history of pre-Roman Italy, however, the name (but *aborigines*, not *aborigines*) appears as that of a special people first settled in the Apennines about Reate, and afterwards in the district of the Lower Tiber, where they are supposed to have taken the name of Latins.

Abortion, the name given in medicine to the expulsion of the ovum from the uterus before the sixth month of gestation. Expulsion between the sixth and ninth month is called a premature labour. Miscarriage, as popularly understood, is the expulsion of the fœtus at any period of gestation, and in law there is no distinction made between A. and premature labour. A. may be either natural or violent. One natural A. occurs in about 2000 pregnancies. Natural A. may be the result of disease of the uterus, placenta, or membranes, or it may be due to general weakness of body, or to the action of zymotic diseases, such as smallpox or fevers, or to violent agitation or shaking, as by jolts on a rough road. Criminal or violent A. may be caused either by mechanical means, such as pressure externally, or by the introduction of weapons into the uterus, or by the action of irritating medicinal substances on the bowels or uterus. Such abortive substances are very numerous, but the principal are oil of savin, ergot of rye, pennyroyal, and powerful purgatives, such as croton oil, elaterium, hellebore, &c. Any person producing or attempting A. in her own person, or in the person of another, is guilty of felony. It is occasionally necessary, however, to induce premature labour with the view of saving the life of mother or child. Such interference is justifiable.

Aboukir (anc. *Canopus*), a fishing village in Egypt, about 15 miles N.E. of Alexandria. It is celebrated on account of Nelson's victory over the French in the battle of the Nile, fought (1st August 1798) in the Bay of A. A Turkish army of 15,000 was defeated here (1799) by 6000 French under Bonaparte; and in 1801 Sir Ralph Abercromby, at the head of a British expedition to Egypt, landed at A., which was surrendered by the French after a sanguinary conflict.

Abousam'bul, or **Ipsambul**, a place in Nubia, on the W. bank of the Nile, notable as the site of two old Egyptian rock-cut temples. They stand a few hundred feet apart. The larger temple is ornamented in front with four colossal figures, 65 feet high. An immense doorway opens on the principal hall, in which two rows of brightly-coloured statues rise from floor to roof. This temple contains fourteen chambers, and retires about 170 feet into the rock. The walls are covered with rude frescoes, supposed to relate to the life of *Rameses the Great*.

About', Edmond François-Valentin, a well-known French littérateur, born at Dieuze (Meurthe), 14th February 1828. He was educated at the Lycée Charlemagne, and the Ecole Normale, in Paris, and studied archaeology for two years at the French school in Athens. On his return to Paris in 1853 he published *La Grèce Contemporaine* (1855), a satire on the shortcomings of the modern Greek character and government. Liveliness of style and humorous incident secured popularity for the work, and gained for the author an instant reputation which his later writings have not done much to extend. The best known of these are *Tolla* (1855), *Les Mariages de Paris* (1856), *Le Cas de M. Guérin* (1862), *Maidon* (1863), *Les Mariages de Province* (1868), and *Le Fellah* (1869), and *Alsace* (1872). *La Question Romaine*, a pamphlet published in 1861, which attracted some attention, urged the abolition of the Pope's temporal power, and was supposed to be inspired by Napoleon III. As the author of some abusive newspaper articles, A. was imprisoned (13th September 1872) for a week by the German authorities, who

chose to treat him as a German subject on account of his being a Lorrainer.

Ab'racadab'ra, a word formerly used by pretenders to magic, and supposed by the ignorant to be capable of expelling from the system various deadly fevers, more especially tertian and semi-tertian agues. It is now only employed in contempt, like the expression *hocus-focus*, to denote a formula that has no meaning. The word was often written in the shape of a triangle.

Ab'raham, the founder of the Hebrew nation, was a native of Ur of the Chaldees (Mesopotamia), and with his wife Sarah and his nephew Lot, emigrated into Canaan. His life and character are exquisitely pictured in the Mosaic narrative; he is the noblest type of a pastoral chief in all literature; free, simple, hospitable, valiant, and devout. His trust in the Eternal was without a shadow of doubt, and it was 'counted to him for righteousness.' Later tradition, which finds an expression in Josephus (*Ant.* i. c. 7), ascribes to A. vast scientific knowledge. He is the inventor of letters, and first taught the Egyptians astronomy and mathematics. The Arabs, who also venerate his memory, affirm that he rebuilt the Caaba, but most of their stories are doubtless borrowed from Jewish sources.

Abraham-a-Santa-Clara, whose proper name was **Ulrich Megerle**, a once popular preacher of Germany, born 1642, died 1709. His sermons are coarse, racy, grotesque, but full of good sense. Even the titles are marked by a rude humour, e.g., *Heilsames Gemisch-Gemisch* ('Wholesome Hodge-Podge,' Sc. 'Mixty-Maxy'). A.'s *Sämmtliche Werke* were published in 21 vols. (Passau and Lindau, 1835-54). A selection appeared at Heilbron (7 vols., 1840-44).

Abrahamites, called also *Bohemian Deists*, is the name given to a religious sect that first appeared in Bohemia about 1782. They made their creed as simple as they supposed that of Abraham to be, and would not admit that they were either Jews or Christians. The Emperor Joseph declined to tolerate them, and in 1783 scattered them over various parts of the Austrian empire, where, in their isolation, they were partly converted and partly martyred.

Abraham-men, sturdy beggars who roamed about the country pretending to be lunatics, and extorted a living from the compassion or terrors of the weak. 'To sham Abraham' is a phrase still in use. In the time of James I., 'an Abram cove' and a 'Tom o' Bedlam' were identical expressions, as the sturdy beggar who had infringed the law often claimed the immunities of lunatics discharged from Bethlehem Hospital.

Abran'chia, an order of animals belonging to the *Annelida*. They receive their name from having none of the ordinary external organs of respiration, breathing from the surface of the skin, or, as some suppose, by interior cavities. The earth-worm and leech belong to the order.

Abrantes, Duke of. See JUNOT.

Abra'anel (also **Abarbanel**), **Isaac Ben Jehudah**, one of the ablest Jewish statesmen and scholars, was born at Lisbon in 1437, of an ancient and illustrious Jewish family. His talents attracted the notice of the Portuguese king, Alfonso V., who frequently employed him on affairs of state, and held him in the highest esteem. On the death of Alfonso, he passed into the service of Ferdinand of Spain, but had to follow his countrymen into exile on their expulsion from the Peninsula. He then betook himself to Naples, and after various changes, died a minister of state in the service of the Venetian Republic in the year 1508. A. was both a learned and eloquent man; his style is flowing and elegant. His principal writings are exegeses of the Pentateuch and the Prophets, commentaries on the Talmudic literature, and a polemical treatise against Christianity. See Jost's *Geschichte des Judenthums und seiner Sekten* (3 vols., Leipz. 1857-59), and Fürst's *Bibliotheca Judaica* (3 vols., Leipz. 1849-63).

Abra'as Stones, the name given to a class of gems cut in various symbolic forms, such as the head of a fowl, the body of a serpent, &c. The word A. is made up of Greek letters. It first figures in the theological speculations of the Gnostic sects, especially the Basilidians, and was probably carried to Spain (where many of these stones are found) by the Priscillianists, who had adopted their views. It is believed that most of the A. were manufactured in the middle ages to serve as talismans.

Abrioot Sauvage, a name given to the mammees apple (*Mamme Americana*), and also to the fruit of *Couroupita guianensis*, which is also called from its appearance the cannon-ball fruit. The shell of the latter is used as a drinking-cup in the West Indies.

Abrogation of a law is the repealing or recalling of it. See ACT OF PARLIAMENT.

Abrus, a genus of leguminous plants. *A. precatorius* is a native of India and other tropical countries. It has small globose seeds, which are of a bright scarlet colour, with a black scar on one side. These are used for necklaces, and in India are employed as a standard of weight. The weight of the famous Koh-i-noor diamond is stated to have been ascertained in this way. The roots are similar in taste to those of the liquorice plant.

Abruzzo, a district of Italy, between the provinces of Latium and Umbria on the W. and the Adriatic on the E., and formerly the most northern part of the kingdom of Naples. Area 4899 sq. miles; pop. 920,000. Its old divisions, Abruzzo Ultiore I. and II., and Abruzzo Citra, have given place to the three Italian provinces, Chieti, Teramo, and Aquila. A. is traversed by the wildest portion of the Apennines, forming the cradle of numerous streams, of which the largest is the Pescara. The famous Gran Sasso d'Italia here lifts its snow-capped peaks to a height of 9590 feet. These mountain masses encircle a multitude of valleys, where the soil is the richest and the husbandry the most wretched. At different altitudes, on the mountain slope and in the plain, flourish the oak, fir, almond, walnut, and olive. The natives are a simple, hardy race, occupied in the highlands, for the most part, in rearing and tending sheep. As a rocky barrier on the north, A. was important in the defence of Naples, and was often the scene of invasion and civil war. In 1799 the French troops were strenuously opposed here by the sturdy mountaineers.

Ab'salom (Heb. *Abshalom*, 'father of peace') was the third son of David, and was noted for the beauty of his person, and especially for a profusion of fine hair. The main incidents of his life are the murder of his half-brother Amnon for dishonouring his sister Tamar, his three years' exile at the court of his father-in-law the Syrian prince of Geshur, his return to Israel and reconciliation with his father, his rebellion and temporary triumph, and finally, his overthrow and death in the wood of Ephraim. David dearly loved his handsome treacherous son, and bitterly mourned his loss.

Ab'salom, Archbishop of Lund. See AXEL.

Abscess. An A. is a collection of pus in any part of the tissues or organs of the body. The pus is usually surrounded on all sides by a layer of lymph which is deposited in the neighbouring tissues, called the wall of the abscess. Thus the pus is prevented from diffusing itself through the tissues. An A. may be acute or chronic. Acute A. is the result of acute inflammation. It is usually accompanied by pain, heat, redness, and swelling, and soon, unless very deeply seated, the wall of the A. gives way at one point, and the pus is discharged. In chronic A. the formation of pus is very slow; sometimes a dense layer of lymph forms a cyst round the matter, but usually, as these abscesses do not 'point' quickly, they burrow for a considerable distance from their original seat. Pus sometimes forms with very slight precursory symptoms, and with no pain. Such an A. is called a cold A. In some cases there is no limiting wall of lymph formed, and the pus spreads quickly and destroys the tissues. Occasionally from abscesses in one part of the body pus is carried by the blood to other organs, and there produces what are termed secondary or metastatic abscesses.

Abscissæ. See CO-ORDINATES.

Absentee, a term applied to proprietors of land and to capitalists who derive their income from one country and spend it in another. In no country is this practice more prevalent than in Ireland. Previous to the union with England, the principal Irish proprietors for the most part resided during the summer on their own estates and during winter in Dublin. The Union changed the habits of the Irish nobility and gentry in this respect. They were in a great measure drawn away to London or the Continent. Those who thus left their own country were re-

proachfully styled 'Absentees;' and it was maintained that their conduct was the great source of Irish poverty, as it drained the country of money. While those who so argued failed to see certain truths in political economy, that gold is not wealth, but merely its representative, and that the quantity of it permanently held by any country is infallibly determined by the productive power of that country relatively to the productive power of other countries, they were nevertheless right in considering 'absenteeism' a real evil to Ireland. The industrial energy of a people is impaired or destroyed by the continued absence of its natural leaders. Power over the tenantry fell wholly into the hands of agents, who, so long as they supplied the pecuniary wants of their principals, were allowed to exercise that power oppressively and cruelly. The evils arising from 'absenteeism' in Ireland have been forcibly drawn by Miss Edgeworth in her novel called *The Absentee*; but while the evils are evident, the remedy will probably only be found in such measures as will promote the general social and industrial improvement of the country. Much may with time be expected from the wise and generous legislation of recent years.

Ab'sinth and Absinthium. See ARTEMISIA and WORM-WOOD.

Absolute (Lat. *absolutus*, 'freed from') means that a thing is considered in itself, and quite apart from any reference to other things. In metaphysics it signifies the unconditioned indefinite original of things—the ground of all visible phenomena; in politics, that form of government in which the authority of the ruler is unrestricted.

Absolute Zero. See HEAT.

Absolution is a term borrowed by the Christian Church from Roman law, in which it properly signifies the freeing or acquitting a person of the charges brought against him. The earliest form of ecclesiastical A. was pronounced by the presbyter and elders in the presence of the congregation, which is understood to imply that the concurrence of the congregation was necessary. As early as the 4th c., however, A. had become an exclusive right of the episcopal office, and the public confession had become a private one, made to a priest, authorised by his bishop to hear, impose penance, and grant A. Protestant churches, as a rule, hold A. to be merely declarative, i.e., that God enjoins or permits ministers to declare His forgiveness of sin to those who repent.

Absorbents. See LACTEALS and LYMPHATICS.

Absorption. The fluid and soluble portions of food enter into the blood of the living animal by absorption. This is effected partly by means of the blood-vessels of the stomach and intestinal canal, and partly by the agency of special absorbent vessels known as the lacteals, present in minute finger-like processes on the lining membrane of the small intestine called the villi. See VILLUS.

Absorption (in botany). Plants absorb carbonic acid gas as well as fluids by their leaves and other green parts, but they depend chiefly upon the roots for nourishment. At the extremities of the rootlets there are a set of delicate cells called *spongioles*, which absorb the nourishing matters from the soil by a process called Endosmose (q. v.)

Ab'stinance Societies. See TEMPERANCE SOCIETIES.

Abstraction is an operation of the mind in which it withdraws (Lat. *abstrahere*) certain attributes of objects from the objects themselves, and either considers them apart or considers the objects exclusively in relation to these. Thus John Smith forms an objective or concrete image. But I can think of him not only in connection with the attributes which are peculiar to him, but in connection with those that are common to him, and some or all of the race to which he belongs. It is a succession of acts of A., each rising higher than the other, to think of him as an Englishman, a European, an Aryan, a man, an animal, a creature. Among the most refined abstractions may be reckoned the ideas of time and space.

Abt, Franz, a favourite German song writer, born at Eilenburg, 22d December 1819. He studied for the Church at Leipzig, but an acquaintance with Mendelssohn determined his preference for the pursuit of music. A.'s songs are full of rich harmony; several of his male quartetts are specially popular.

Abu, means in Arabic father, and is merely a form of the Hebrew *Ab*. See **ABBA**. In both languages the word enters into the composition of many proper names—e.g., *Abu-Bekr*, 'Father of the Virgin.' Often, however, the term father is used figuratively for 'possessor' in such cases—e.g., *Abulfeda*, 'Father of Fidelity,' i.e., 'the Faithful'; *Abner*, 'Father of Light,' i.e., 'the Brilliant.'

Abu, the highest mountain of the Aravulli range, in Rajpootana, Hindustan, about 5000 feet above the sea, with a very broad base and a summit divided into numerous peaks. At Dilwara, about the middle of the mountain, are four Jain temples, to which frequent pilgrimages are made. One of these temples is said to be unsurpassed in all India. The English of late years have begun to use *A.* as a sanatorium.

Abu-Bekr, the first Arabian calif, belonged to the great Koreish tribe, and was born at Mecca 573 A.D. His original name was Abd-el-Kaaba ('servant of the Temple'), which he changed into Abd-Allah ('servant of God') when he became a disciple of Mohammed. The name *A.* was given to him after the Prophet had married his daughter Ayesha (who was a virgin, and not a widow like the other wives of Mohammed). He only held the califate for two years, dying at Medinah 23d August 634; but it was during his brief rule that the new religion first began to seriously threaten the Byzantine empire. *A.* was a man of much learning and of great enthusiasm.

Abulfaraj, otherwise Barhebraus ('son of the Hebrew'), born at Malatia, Armenia, in 1226, died 1286. His profound acquaintance with philology, philosophy, theology, and medicine procured for him the title of the phoenix of his age. He died prime of the Christian sect of the Jacobites. *A.*'s best known work is a chronicle of universal history from the creation to his own time, written first in Syriac and afterwards in Arabic. The Arabic chronicle was translated into Latin by Pococke (Oxf. 1663). There is also a German version by Bauer (Leyden, 1783-85), and Bruns and Kirsch published both the Syriac and Arabic texts with a Latin translation (Leipzig, 1789). The work is full of details little known concerning the wars of the Mongols and Tartars. *A.* wrote numerous other works, one of which, an *Ecclesiastical History*, has been translated by Tullberg of Upsala.

Abulfeda, a Moslem prince sprung from the same Kurdish stock as Saladin, of high repute as a writer of history, born at Damascus A.D. 1273, died in 1331. From 1310 to his death he was prince of Hamat, Syria. His *Annals*, written in Arabic, were published at Copenhagen by Reiske (1789-94), under the title of *Annales Moslemici*. His *Geography* was published in full by Schier (Dresden, 1842), and also by Reinaud (Paris, 1848), with a French translation.

Abushehr, or **Bushire**, a seaport on the Persian Gulf, at the point of a barren sandy peninsula. It is well situated for commerce, and, despite a capricious climate, has become the emporium of the Indo-Persian trade. A strong natural position enabled *A.* to make a vigorous stand against the English in 1856, when it was taken by Sir H. Leeke. It is now an Indo-European telegraph station. Its chief exports are silk, fruits, pearls, asafetida, and horses (for cavalry service in India); imports, sugar, rice, indigo, and British manufactured goods. Pop. 15,000.

Abutilon, a genus of plants belonging to the order *Malvaceæ*. In Brazil the flowers of *A. esculentum* are used as an article of food. *A. indicum* and *polyandrum*, two Indian shrubs, furnish a strong fibre used for ropes. All the species of *A.* contain a quantity of mucilage.

Abutment, the name given in architecture to that part of a pier or wall from which the arch springs; when the arch is semicircular the term used is *inpost*. In bridges, the walls that support the ends of the roadway are also called abutments.

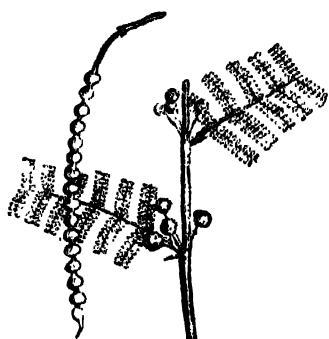
Abydos, a town of Asia Minor, on the Hellespont, opposite Sestos. The channel here is only 7 stadia wide. Near *A.* Xerxes formed the bridge of boats (B.C. 480) over which his army crossed to Europe. *A.* is associated with the story of Hero and Leander. Another *A.*, on the Nile, has acquired some celebrity from the discovery there of a hieroglyphical genealogy of the 18th dynasty of the Pharaohs.

Abyssinia, a country in the N.E. of Africa, bounded on the E. by the Red Sea, on the N. and W. by Nubia and Kordofan, and encircled on the S. by the Blue River or Nile. It lies between 8° 30' and 15° 40' N. lat., and between 35° and 42° E. long., and is in the form of an immense tableland, intersected by deep gullies worn by the rivers. It is separated by nature into three great divisions; going from north to south, these are (1) Tigré, where the Geez, a Semitic dialect, is spoken, and which forms the main approach to the Red Sea; (2) Amhara, where the language is non-Semitic, and which contains Gondar, the nominal capital of the kingdom; and (3) Shoa, in the extreme south, surrounded by hostile Galla tribes, and also speaking the Amharic dialect. Some of the minor provinces are Lasta, Waag, Semen, and Godjam. Though within the tropics, the climate is equable and salubrious, because of the great elevation of its tablelands, which rise to a height of from 7000 to 10,000 feet. From these plains spring many volcanic mountain chains, the highest being that of Samien, 15,000 feet above the sea. There are many rivers, the largest being the Abai or Blue Nile (Bahr-el-Azrek), the Takkazie, a tributary of the Nile, and the Hawash, which flows east towards the Gulf of Aden. In the heart of the country, lies the Tzana or Dembea, a large lake, through which the Blue Nile flows. The productions are chiefly wheat, barley, maize, native grains called Tef and Toccusso, coffee, sugar-cane, and tobacco. The soil is generally rich, and in many parts the coffee-plant is indigenous. The most numerous of the wild animals are the lion, leopard, wolf, hyæna, and jackal; elephants, rhinoceroses, buffaloes, and giraffes are found; and hippopotami abound in the large rivers. The name *A.* is derived from the Arabic *Habesh*, which means a mixed people, and seems to throw some light on its ethnology. The predominant race occupying Amhara is Semitic, with oval face, thin lips, sharp nose, and straight hair. Another race, with features approaching the negro, inhabits the north; and the Gallas, a savage, warlike people, with round faces, thick lips, and woolly hair, occupy the south of Shoa. All the native races are of brown colour; the only negroes being those brought from the interior as slaves.

A. was first made known in Europe in the 15th c. by the Portuguese missionaries; but long before that period it had a place in history. Christianity had found its way thither in the 4th c., if not earlier; and in the 6th c. the nation was sufficiently strong to invade Arabia and seize part of Yemen. Misfortune followed this conquest, however, and for many centuries *A.* was a scene of chronic confusion and bloodshed. In 1540, assisted by the Portuguese, the empire was rescued from the hands of the sultan of Adal. As a condition of the support of the Portuguese, the royal family embraced the Roman Catholic faith, and a fruitless effort was made to supplant the old Coptic Church. The monarchy, which had long been absolute, now greatly declined, and the question of succession frequently gave rise to protracted struggles, which ultimately broke up the kingdom into petty governments. There have been at one time as many as twelve claimants to the crown, each supported by one of the powerful feudatories, who, under the name of *Ras* (head or chief), were the actual powers in the kingdom. In 1847 *Ras Ali*, a man of great intelligence and enterprise, became chief of Amhara. Under his rule the province made considerable advance, and for the first time relations were entered into with England. Military success, and the marriage of his mother to the nominal emperor, had all but established the supremacy of *Ras Ali*, when a rival appeared in Kassai (afterwards Theodore), his own son-in-law, who had early shown courage and skill as a soldier. Kassai was at first defeated and forced to withdraw, but finally overcame the troops sent against him, and was crowned in 1858 by the Abuna of the Coptic Church as Theodore of Abyssinia. Elated by success, the new-made king marched on Shoa, the third great province of the old empire, attacked and defeated the Wollo Gallas, and reached Ankobar, the southern capital, almost without opposition. Great leniency was shown to the conquered countries, and the commercial relations entered into with Europe were encouraged. In 1863 Theodore applied to Queen Victoria for aid to repel the Egyptians from his north frontier, but his letter was unaccountably neglected. Enraged by this supposed slight, he imprisoned the newly-appointed English consul and a party of missionaries. Meantime an answer from England arrived, but Theodore cast the envoy into prison. This direct violation of international law occasioned a great outcry in England, and all

attempts to negotiate with Theodore having proved ineffectual, Lord Stanley's ultimatum was issued in April 1867, ordering the delivery of the prisoners within three months. No notice was taken of this missive, and an expedition was accordingly prepared. An army of 12,000 men, under the command of Sir Robert Napier, was brought from India and landed at Zulla on the Red Sea in November. After encountering many difficulties the expedition reached Magdala (q. v.), and on the 10th April 1868 completely routed Theodore's army, and released the European captives. No lives were lost on the British side; but of the Abyssinians there were 500 killed, including Theodore himself, who was found shot in the head. The object of the war was solely the release of the captives and the punishment of Theodore, and the internal affairs of A. were left untouched. The cost of the expedition amounted to £8,600,000. A. has been a good deal disturbed since the death of Theodore by intestine war, and is now governed by Kassa, formerly Ras of Tigré, who was made king at Axum in January 1872. The chief exports are dye-stuffs, spices, ivory, and gum; but of late the trade of A. has very much decreased, and the want of good internal communication in so wild a country may seriously interfere with the prospects of commerce. A considerable trade in slaves is still carried on with Turkey and Egypt. The pop. is estimated at 3,000,000. See Plowden's *Travels in A.* (Lond. 1868), Wilkin's *Reconnoitring in A.* (Lond. 1870), and the official *Record of the Expedition to A.* by Holland and Hozier (2 vols., Lond. 1870).

Acacia, a genus of dicotyledonous trees and shrubs belonging to the sub-order *Mimosa* of *Leguminosæ*. There are numerous species, chiefly found in the warm countries. The Australian species are called *leafless*, as the true leaves are seldom developed, but the petioles or leaf-stalks become large, and perform the functions of leaves.



Acacia arabica.

These are termed *phyllodia*. Some of the species are of great economical importance. Gum-arabic is exuded from *A. Verr.*, *A. arabica*, *A. vera*, *A. Adansoni*, and other species, natives of the East. The drug called *Catchu* is prepared principally from *A. catchu*. The wood is boiled, and the decoction evaporated, which leaves an astringent extract. Bahool or Babul gum and bark are obtained from *A. arabica*. The latter is used in

Scinde for tanning. *A. Farnesiana* yields a perfume. The seeds of *A. Niopo* are ground and used as snuff among the natives in some parts of S. America. Many kinds are cultivated in greenhouses in Britain.

Academy. The word is derived from a spot in the suburbs of Athens called *Akademia*. There Socrates, and subsequently Plato, used to meet and converse with their pupils. It was the latter, however, who made the place famous by the establishment of his A., the school of philosophy over which he presided for fifty years. Plato died 348 B.C. After his death the modifications of his doctrine which came to be taught occasioned a division of the school into three branches—Old, Middle, and New A. The first term is applied to the school holding the Platonic doctrine pure, the second to the school of Arcesilaus, the third to the school of Carneades.

It is now common in England and America to call an A. any school professing to give a high-class education; but societies formed for the advancement of learning, science, or art are also frequently so named. The first institution of this kind in ancient times was the famous Museum founded at Alexandria in the 3d c. B.C. by Ptolemy Soter. It was the model of later institutions founded by the Jews and Arabians; and of that of Charlemagne in the 8th c. Though it did not survive the death of Charlemagne, his A. gave an important impulse to learning, and probably laid the foundations of the modern French language. Its extinction was owing to the jealousy of

the clergy, who feared that it would injure their authority as the sole expounders of civil and divine law.

The fall of Constantinople in 1452 caused many learned Greeks to take refuge in Italy. There, under the liberal patronage of the Medicis, they worked with zeal and success to rekindle the torch of classic learning, which had been extinguished for 1000 years. In the following century academies of wider scope arose in Italy; whose example was followed over Europe generally.

There are two classes of academies, the one having general and the other specific objects. The most noteworthy examples of the former are the *Institute de France*, founded by Colbert under another name in 1666; the Berlin Academy of Arts and Sciences, founded in 1700, and enlarged and vivified by Frederick the Great; the Imperial Academy of Sciences of St Petersburg, designed by Peter the Great, and established by his widow, Catherine I., in 1725; the Academies of Sciences at Stockholm, Copenhagen, Munich, and Vienna. It is impossible within our limits to note examples of all the different kinds of *special* academies. It is enough to say that they exist for the advancement of linguistic, historical, archaeological, medical, artistic, and other studies. Many learned societies differ from academies only in name, such as the Royal Society of London, &c.

• **Acæna**, a genus of rosaceous plants, including upwards of forty species, mostly small, and found chiefly in temperate regions. Certain species are met with at a great elevation on the Andes. *A. ovina* is a common weed in Australia and Tasmania, where it is a troublesome plant to sheep-farmers, from its spiny fruit getting entangled in the wool of the sheep. The 'Piri Piri' of New Zealand is a decoction of the leaves of *A. Sanguisorba*.

Acal'ephæ, a class of marine animals, commonly known as sea-nettles, on account of their producing a stinging sensation when touched, or jelly-fishes or sea-blubbers, from their gelatinous consistence. The name Medusæ is frequently given to them. They are transparent, often shaped like a mushroom, and vary in size from a pin-head to nearly a yard in diameter. Their metamorphosis is very remarkable. Many of them are phosphorescent, and render the sea luminous.



Acal'ephæ.

Acal'ypa, a genus of dicotyledonous plants belonging to the order *Euphorbiacea*, embracing about 100 species, natives of tropical and sub-tropical regions. Many of them are perennial shrubby plants, with nettle-like leaves. *A. rubra*, the string wood of St Helena, is now supposed to be an extinct species. It was a small tree, with long spikes of reddish-coloured flowers. *A. indica*, an annual weed in India, is said to attract cats as much as valerian.

Acantha'ceæ, a natural order of dicotyledonous plants, including about 1000 species, common in tropical regions. They are of little economical value, the most of them being weeds, although a few have beautiful foliage and flowers, such as some species of *Justicia* and *Kuellia*. Some are mucilaginous and bitter, others yield dye. Room, a blue dye, is obtained from a species of *Kuellia* in Assam.

Acantho'phis, a genus of Australian venomous serpents closely allied to the vipers (q. v.) They inhabit holes under the roots of trees and stones, and are very tenacious of life. One species (*A. Brownii*), found at Port Jackson, is one of the most venomous.

Acanthop'tery'gii, one of the three natural orders into which fishes are divided. They have bony skeletons, with prickly processes in the dorsal fins, as, for example, the perch and stickleback.



Acanthus spinosus.

ornamented with *A.* leaves, resembling those of the last-named species.

Acapell'a or **All'a capell'a**, a term applied in old Italian church music to vocal compositions in the severest state without any accompaniment. This was up to the time of Claudio Monteverde, in the second half of the 16th c., the usual state of church music. In modern times *A. capella* denotes a piece of vocal music, sacred or profane, without accompaniment, or with the instruments playing in unison with the voices.

Acapul'co, a town of Mexico, on a bay of the Pacific, with one of the finest harbours in the world. It had at one time the monopoly of the rich Spanish trade with the East, but the port is now little frequented. The climate is extremely hot, and the town mean and unhealthy. The principal buildings were destroyed in 1852 by an earthquake. Pop., chiefly coloured, 4000. The main exports are cochineal, indigo, cocoa, wool, and skins; the imports silks, spices, cottons, and hardware.

Acar'idæ, a group of small spider-like animals, including the mites (*Trombidites*), ticks (*Ricinites*), water-mites (*Ilydrachnellæ*), and flesh-worms (*Microphthira*). The itch-insect, the cheese-mite, the red spider of our gardens, and the common harvest-bug belong to the group.

Acarna'nia, anciently the most western part of northern Hellas, bounded N. by the Ambracian Gulf, E. by Ætolia, W. and S. by the Ionian Sea. The numerous harbours on its rocky and mountainous coast became at an early date the homes of Doric colonists, but the native Acarnanians were not prominent in Greek history, and were noted mainly for stubborn valour. In modern times *A.* forms, along with Ætolia, a nomarchy of the kingdom of Greece, and has for its capital Missolonghi (q. v.)

Acathist'us, a song of praise in the Greek Church in honour of the Virgin Mary, sung in the fifth week of Lent, and derives its name from the congregation *not* being permitted to *sit down* during the whole night.

Acaulo'sia, a diseased condition of the stems of plants, in which the stem is either imperfectly developed or entirely wanting.

Acceleran'do (Ital.), speedily (*più*, much, *poco a poco*, gradually), means with growing rapidity (*tempo crescendo*) and increasing expression.

Accelerated Motion, in dynamics, is motion in which the velocity is never for any finite time constant, but is continually increasing. The rate of increase of velocity is called 'acceleration.'

Acceleration of the Moon, the fact first observed by Halley that, for several thousand years, the time of the moon's revolution round the earth has been decreasing, or her velocity has been increasing. Laplace showed this to be due to the varying eccentricity of the earth's orbit, which has been decreasing since

12,000 B.C., and will continue so to decrease till 37,000 A.D., after which it will begin to increase.

Ac'cent, in grammar, is the stress or pressure of the voice placed upon a syllable of a word to make it prominent, either for oratorical or vocabulary purposes. The Greek grammarians used accentual marks, it is said, to assist foreigners in learning their language, and there can be no doubt that *A.* played a far more important part in the enunciation of ancient Greek than most modern scholars (except Prof. Blackie) allow. In Hebrew, *A.* was always on the last syllable or the last but one; in Greek it might be on any of the last three syllables of a word; in Latin it was confined to the penultimate or ante-penultimate; and in English the irregularities inseparable from so composite a language have shown themselves in a certain lawlessness of *A.*, but it may be said that there is a strong tendency at present to throw it back to the beginning of words, which was its usual place in the English spoken and written before the Norman Conquest. It is interesting to trace the struggle of English and French *A.* in Chaucer. We find him writing at one time *bataille* and again *bat'aille*, *for'tune* and *fortu'ne*, &c.; but on the whole the native method triumphed, and Romance words received not only an English form, but an English *A.*, though the exceptions are numerous.

Ac'cent, in music, is the emphasis or stress laid upon single notes, parts of bars, or whole bars, and is divided into two kinds, viz., grammatical (metrical) and rhetorical. The grammatical accentuation is the natural one, without which any piece of music would be wanting in organic cohesion, and would therefore be incomprehensible. The rhetorical accentuation is not an artificial antithesis to the former, but surpasses its simple regularity, and is an essential part of an expressive performance.

Accept'ance, in its general sense, is the act by which any one agrees to terms, or undertakes a duty. The word is not technical in the law of England (see *CONTRACTS*) except as applied to a bill of exchange (see *BILL OF EXCHANGE*); when it means the act by which the person or firm on whom the bill is drawn, i.e., the 'drawee,' binds himself to pay the bill in whole or in part. In England this act may consist in the drawee merely writing on the bill the word 'accepted,' or *A.* may be inferred from circumstance. In Scotland the signature of the acceptor is required. The term is also technical in Scotch law of contracts. It may be written, verbal, or by inference.

Accessary or **Accessory** is one guilty of crime, not principally but by participation. The incriminating act may be either *before* or *after* the fact. An *A. before* the fact is one who advises or incites another to commit a crime, himself being absent at committal. An *A. after* the fact is one who assists the felon. In Scotch law the equivalent term is 'art and part'; a verdict of 'guilty art and part' having the same effect as a verdict of 'guilty.'

Access'ion, the acquiring of property by addition. In the law of England and of Scotland *A.* is either natural or artificial. By natural *A.* the young of cattle belong to the owner of their mother. Artificial *A.* denotes the acquisition of property which is the result of human industry; thus a house belongs to the owner of the soil on which it is built, and not to the builder.

Access'ion, Deed of, in Scotch law the deed by which creditors accept a trust-settlement of their debtor is so called. 'Liquidation by arrangement' is the analogous procedure of English law. See *BANKRUPTCY*.

Accessory Ac'tion is, in the law of Scotland, an action subservient to another.

Accessory Obliga'tion, in the law of Scotland, is an obligation annexed to another, antecedent.

Acciden'tal Col'ours. See *LIGHT*.

Ac'cidents, in logic, is the name given to those predicables of an object which may be changed, or abstracted, without, it is said, the object becoming essentially or substantially different from what it was before, e.g., a man may be 'intoxicated.' The 'accident' is a separable one; he would be no less a man if he were 'sober.'

Accipitres, the name of a Linnean order of birds, including those which have the beak hooked, with a broad lobe on each



Accipitres.

side near the point. They have also strong sharp-hooked claws. Eagles, falcons, hawks, and owls are examples of the order, which are described under the separate heads.

Acclimatization. 1. *Animals.* This term may be used as somewhat synonymous with the domestication of animal forms in a country foreign to them. The peacock at present domesticated in Europe generally, has thus become acclimatised, its native country being India, where immense flocks of these birds occur in a wild state. The domestic turkey is similarly indigenous to N. America, where it still occurs in a wild state. Numerous examples of acclimatised animals may be thus found—the horse, originally from Central Asia; our numerous breeds of cattle and sheep, the progenitors of which are so difficult to trace or discover; and other analogous instances, will readily suggest themselves. The term 'acclimatise,' in the abstract, at least, may also be used with regard to the introduction of the fishes of foreign seas and rivers to British waters. In view of the breeding of such fishes to maintain a food supply, their A. becomes a feature of great commercial and economical import. The *Silurus glanis* of the European rivers and Swiss lakes has thus been proposed as a valuable addition to our food fishes, and experiments with a view to its cultivation are still in progress. Similarly, in Australia, British salmon, reared from ova exported to that colony, are now thriving. The conditions under which the A. of animals can be successfully carried out, are chiefly involved in the study of the natural and surrounding phases of their existence. Thus, temperature, food, the occurrence of migration, the breeding seasons, and many other and kindred points, have to be carefully considered, with a view to successful A.—2. *Plants.* Some suppose that tender plants of warm countries can be acclimatised by slow degrees to cold climates, but this has not been clearly proved by facts. There are certain limits of temperature within which certain species will only exist, although these limits often vary much. Many plants from warm regions, when first introduced into Britain, were grown in greenhouses and stoves, and subsequently planted out, and quoted as cases of A., whereas they were capable of enduring the cold of this country from the very first. The Japan laurel (*Aucuba japonica*), now so common in gardens, was treated at first in this manner. The African pondweed *Aponogeton* (q. v.) was long grown in hot-water tanks at the Edinburgh Botanic Gardens, when accidentally a specimen was thrown into an open-air pond, where it has flourished ever since. Species brought from warm countries, and supposed to be delicate, are often quite hardy in Britain, such as the *Araucaria* from Chili, and many Japan and Nepal plants; while, again, the potato, the dahlia, and some others which have long been cultivated in Britain, are not in the slightest degree hardier than when first introduced, but are killed down by the first touch of frost.

Accolade. When a candidate for knighthood was received into his order, the grand-master embraced him, folding his arms round the neck (*ad collum*) of the new member. This act was termed in French the A.

Accompaniment (in music), part or parts added to a solo, instrumental or vocal, to support and enrich it. In chamber-music the A. is commonly played upon the pianoforte; in opera or oratorio it is arranged for an orchestra. The A. for a *concerto*, or accompanied instrumental solo, is always for an orchestra. Occasionally a piece of music is written for a solo instrument

accompanied only by two or three others; and in some cases a vocal chorus is used to accompany a solo voice. With the older composers the A. to a vocal solo was often itself a composition written in parts, and possessing considerable inherent difficulty and complication. The modern Italian writers, and the composers of operas bouffes, and of 'drawing-room' songs, have gone to the other extreme, and made their accompaniments mere meaningless rhythmic repetitions of commonplace chords. A good A. should express the same idea as the solo, but enlarged and developed; it should have form and interest of its own, but should neither drown the solo by its loudness nor dwarf it by appropriating interest properly due to the principal part. The songs of Schubert form excellent illustrations of the beauty and variety which A. can take in the hands of a great musician.

Accordion, a toy instrument in which wind supplied by bellows causes the vibration of metallic tongues of various strength and various sizes.

Accountant, a profession whose business it is to audit and unravel accounts, and to adjust and balance mercantile accounts and books. An A. ought to be thoroughly skilled in Book-keeping (q. v.), and in mercantile practice generally. He ought to have a competent knowledge of commercial law. It will also be an advantage to him to have at least an elementary knowledge of algebra. In a commercial country like England, this profession is plainly one of very great importance. Hence in all our great cities it is one which has been largely followed by men of requisite education and ability. Yet, strange to say, it is only of recent years that it has been recognised as forming a distinct and honourable profession, for whose proper exercise some years of preliminary study and training are required. See notice of Chartered Accountant, *infra*.

Accountant in Bankruptcy. The A. in B. is a Scotch law officer whose business it is to watch over the proceedings of trustees and commissioners in bankrupt estates. The office was created under the Act of 1854. See BANKRUPTCY.

Accountant of Court of Session is an officer whose duty it is to superintend the conduct of all judicial factors, tutors, and curators in Scotland.

Accountant, Chartered. In addition to the usual duties of an A. in Scotland, the profession discharge the duties which in England formerly belonged to the Masters in Chancery. They act as trustees on bankrupt estates, as judicial factors, as arbiters and referees, privately, or under remit from the Court of Session. In Edinburgh the body was incorporated by royal charter in 1854. The members are professionally designated by the initials C.A. For admission to the corporation a pupil must be articled to a member, and pass examinations in law, mathematics, and book-keeping. There is a similarly constituted society in Glasgow, incorporated by royal charter.

Accrington, a town of Lancashire, 19 miles N. of Manchester, on the banks of the Hindburn, is an important seat of the cotton-printing trade in England. It has also numerous cotton-mills, large bleaching-works, and coal-mines. Pop. (1871) 21,788.

Accum, Friedrich Christian, chemist, was born at Bückeburg on 29th March 1769. He went to London in 1793, held for some time the post of lecturer at the Surrey Institution, but ultimately returned to Germany, and obtained employment in Berlin, where he died 28th June 1838. His best known work is *A Practical Treatise on Gas-Light* (Lond. 1815), which was the means of introducing that mode of illumination into this country. A.'s writings, both German and English, entitle him to more recognition than he has got.

Accusative Case. See DECLENSION.

Acephala, a class of Mollusca having no conspicuous head. Some of the species are naked, others have a shell covering—the latter are the most numerous.

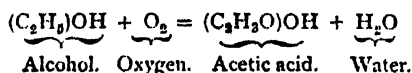
Acephalocysts, a name given by Lænnec to small bladder-like bodies found in various tissues of the body, more especially in the liver. They are now called hydatids, and are known to be tape-worms in a particular stage of development. See TAPE-WORMS or TÆNIA.

A'cer, a genus of dicotyledonous trees, including the sycamore and the maples; they are indigenous to temperate regions. From their rapid growth, and beauty of foliage, several species are largely planted in Britain. In America *A. saccharinum* is of great economic value, sugar being manufactured from the sap. See MAPLE-SUGAR. The common sycamore, *A. Pseudo-Platanus*, called plane in Scotland, is supposed to have been introduced into Britain from the Continent in the 14th c. The tree grows to a large size, and its wood, which is white and firm, is used for a variety of purposes. It is one of the most valuable of woods as fuel, and for making ordinary charcoal. It received the name sycamore from a former belief that it was the tree of that name mentioned in the New Testament, which, however, is a species of fig (*Ficus Sycomorus*). Other important species of *A.* are *A. campestris*, a small tree, native to England, but naturalised in Scotland; it is the badge of the Clan Oliphant; *A. platanoides*, the Norway maple; *A. striatum*, the striped maple; and *A. rubrum*, the curled maple of America.

Acera'ces, a natural order of exogenous or dicotyledonous trees inhabiting the temperate parts of Europe, Asia, and North America. The sap of some species in the order yield sugar. See MAPLE-SUGAR. Their wood forms useful timber. Their bark is astringent, and yields reddish-brown and yellow coloured dyes. The order includes three genera and about sixty species.

Acer'ra (anc. *Acerra*), a cathedral town of Italy, province of Caserta, 9 miles N.E. of Naples, with which it is connected by railway. The neighbourhood is malarious, partly owing to half-stagnant canals, and partly to the stalks being left to rot in the flax-fields. Pop. 12,000.

Ac'e'tic Acid diluted with water is the principal ingredient of common vinegar, whence its name (*acetum*, Lat., vinegar). It occurs in small quantities in the juices of plants and of animals, sometimes in the free state, but usually combined with bases. It is produced by the oxidation of alcohol; one atom of oxygen removes two atoms of hydrogen in the form of water, and another atom of oxygen replaces the two atoms of hydrogen thus removed.



Vinegar, which contains about 5 per cent. of *A. A.*, is produced by exposing beer or wine mixed with nitrogenous substances to the air; a particular ferment (*Mycoderma aceti*) develops, and through its agency oxidation of the alcohol, contained in the beer or wine, gradually takes place. Pure *A. A.* is usually obtained from the acid liquor produced by the distillation of wood. See PYROLIGNEOUS SPIRIT. From this liquor acetate of lime is prepared, and on distilling this salt (previously dried) with strong sulphuric acid, pure *A. A.* passes over.

In its pure state *A. A.* is known by the name of *glacial A. A.*, and is a solid crystalline substance at temperatures below 16° C. It boils at 119° C., and has the specific gravity 1.063. Applied to the skin it causes a blister, and is sometimes used as a caustic. It is miscible in all proportions with water, alcohol, and ether.

A. A. combines with bases to form salts, which are called *Acetates*. The best known of these are acetate of lead, or sugar of lead; acetate of ammonia, known in solution as spirit of milderer; acetate of alumina, used in dyeing; and a basic, acetate of copper, called verdigris.

A. A. is used in the arts and in pharmacy. Its chemical composition is expressed by the formula $\text{C}_2\text{H}_4\text{O}_2$. Its constitution by the formula $\text{CH}_3\text{--COOH}$, which shows it to be a *monobasic acid*: It has been prepared synthetically, that is to say, has been built up from its elements, carbon, hydrogen, and oxygen.

Aoh, the name given to a red dye obtained from the bark of the root of *Morinda tinctoria*, a small tree of Central India. The colour is rather fugitive, but alum is used to fix it. The wood, which is hard and durable, is used for gun-stocks and other purposes.

Aoh'e'ne, or **Achene**, a term applied to any small, hard, indehiscent fruit, such as Linnæus called a naked seed. Examples of *A.* are seen in the fruit of buttercup, borage, and dead-nettle. The *achenia* of the rose are enclosed within the fleshy calycine

tube; in the strawberry they are borne on the succulent receptacle which is eaten.

Acha'ia, anciently the name given to the northern coastland of the Peloponnesus. It is mainly mountainous, but the valleys and shores are fertile, and still produce abundance of corn, wine, oil, and fruits. The Achæians in Homer's time were of such importance that their name was given to all the Greeks, and after the Roman conquest, B.C. 146, the ancient designation was revived, and Greece became the province of *A.* From B.C. 280 to B.C. 146 the *Achaian League* was the most powerful body in Greece. In modern times *A.* forms, along with Elis, a nomarchy of the kingdom of Greece, with Patras for its chief town.

Ach'ard, Franz Karl, a German naturalist and chemist, was born at Berlin in 1753, and died at Kunern in 1821. He is chiefly celebrated for his improvements in the manufacture of beet-sugar, in which he was supported by the King of Prussia. His principal literary work is an essay on the *European Manufacture of Sugar from Beet* (Leipzig. 1809).

Achar'd, Louis Amédée, Eugène, a prolific French litterateur, born at Marseilles in 1814. He first acquired note as an author by his contributions to the *Vert-Vert*, *Entr'acte*, and *Charivari*. Among his best known writings are his *Lettres Parisiennes* (1845), under the pseudonym of Grimm; the romance of *Belle-Rose* (1847), perhaps the most charming and popular of all his writings; a new set of *Lettres Parisiennes* (1849); *La Chasse Royale* (1849-50); *Les Petits-fils de Lovelace* and *Les Châteaux en Espagne* (1854); *Maurice de Treuil, Madame Rose*, and *Le Clos-Pommier* (1856-57); *Les Séductions* (1860); *Les Mœurs d'un Millionnaire* (1861); *Noir et Blanc* and *Le Roman du Mari* (1862); *Les Fourches Caudines* (1866); *La Chasse à l'Idéal* (1867); *Marcelle* and *La Vie Errante* (1868). Besides these fictions, *A.* has written many pieces for the theatre. He died March 27, 1875.

Achelous, now the **Aspropotamo**, or White River, the largest and most famous river in Greece, rises in Mount Pindus, and flows into the Ionian Sea. It is celebrated in ancient mythology, for the combat between its tutelary deity and Hercules for the possession of Deianeira.

Ach Abach, Andreas, one of the most prolific German painters of modern times, was born at Cassel 29th September 1815, studied at Dusseldorf under Schadow, and has devoted himself chiefly to landscapes and sea-pieces. The Rhine, the Alps, Norway, Italy—all places, far and near, have furnished scenes for his vivid and brilliant pencil. Most of the German galleries contain specimens of his work, but the greatest number are to be found in the Pinakothek of Munich. A few of his more notable pictures are, *High Tide at Ostend*, *View of Corleone in Sicily*, *A Stormy Sea on the Coast of Sicily*, *Moonlight, a Landscape*,—all of which figured at the Paris Exhibition of 1855; *Sea-shore at Scheveningen in Holland* (1861), *Landscape in the Netherlands* (1863), *Neighbourhood of Ostend in rainy Weather* (1866). *A.* is a member of the Royal Academies of Berlin, Amsterdam, Philadelphia, &c.

Acheron (Gr. 'river of woe'), the name of several rivers, once supposed, from their bitter taste or dark colour, to have a connection with the infernal world. The *A.* in Epirus passes through lake Acherusia, and flows into the Ionian Sea; the *A.* in Elis, now the Sacuto, is a tributary of the Alpheius; and Pliny mentions an *A.* which cannot now be identified. Homer's *A.* is one of the rivers of the nether world.

Ach'lar, a condiment, formed of the young shoots of bamboo in some parts of India.

A'chill, or 'Eagle' Isle, lies off the county Mayo, Ireland, and has an area of 35,000 acres. The soil is boggy and barren; the houses are mere hovels; and emigration and a high death-rate are gradually reducing the population. *A.* is one immense mass of mica slate, and rises towards the north in a mountainous ridge about 2000 feet high, overhanging the sea. The largest of the three villages of *A.* is a mission-station, with a corn-mill, printing-press, and schools. Pop. (1871) 6417.

Achill'ea, a genus of plants belonging to the natural order *Compositæ*. *A. Plarmica*, sneezewort, and *A. Millefolium*, yarrow or common milfoil, are natives of Britain. The former is

common in moist meadows, and when pulverised it has the property of exciting sneezing. The plant is aromatic and pungent. The common milfoil is astringent, and was at one time used as a vulnerary. It has been called nose-bleed, 'because the leaves being put into the nose caused it to bleed.' The musk milfoil, *A. moschata*, is sometimes cultivated as food for cattle. The Swiss tea of the Alps is formed of the dried plants of *A. atrata* and *A. naja*. *A. ageratum* is used on the Continent as a vulnerary.

Achilles, the son of Peleus, and of the Nereid Thetis, was instructed in eloquence and the arts of war by Phoenix, and in medicine by the centaur Cheiron. Though warned by his mother that the pursuit of glory would result in an early death, he led the Myrmidons to Troy in fifty ships, and was there the great bulwark of the Greeks. Being deprived by Agamemnon of Briseis, he ceased to take further part in the war, and the fortunes of the Greeks became desperate. The slaughter of his friend Patroclus at last roused him to action, and reconciling himself to Agamemnon he attacked the Trojans, of whom he slew great numbers, and among them their bravest warrior Hector, whose body he afterwards restored to Priam for a ransom. Here the Homeric legend ends, the death of A. in battle at the Scaean gate not occurring in the Iliad, though mentioned in the Odyssey. Later legends represent his mother as having dipped him in the Styx to render him immortal, in which she succeeded, with the exception of the ankles, by which she held him, while the so-called Dictys Cretensis affirms that he was assassinated by Paris in the temple of Apollo at Thymbra, whither he had come as the lover of Polyxena, one of Priam's daughters. His concealment, disguised as a maiden, among the daughters of Lycomedes of Scyros, that he might not accompany the Greeks to Troy, where it was prophesied that he should perish, his discovery by Odysseus, the contest between Odysseus and Ajax for the possession of his armour, are legends of comparatively late date, as also that of his being appointed a judge in the infernal regions, and having his abode in the 'Islands of the Blest.'

Achilles Tatius, called by Suidas, Achilles Statius, a Byzantine rhetorician, who probably belonged to the end of the 5th or beginning of the 6th c., as he imitates Heliodorus of Emesa. He is the author of a licentious romance (*The Loves of Leucippe and Cleitophon*), which is, notwithstanding, one of the best love-stories of the Greeks. It has been edited more than once, but the best edition is that of Fr. Jacobs, Leipzig, 1821, 2 vols. 8vo.

Achime'nes, a genus of dicotyledonous herbs belonging to the order *Geraneaceæ*. They are much cultivated for the beauty of their flowers and foliage in British stoves and greenhouses. They increase principally by scaly underground tubers.

Acholia. When from destruction of the liver-cells the elements of the bile are not separated from the blood, jaundice is the result. This is A. It is to be distinguished from those cases of jaundice in which, from obstruction of the bile-ducts, bile is prevented from flowing away, and is consequently reabsorbed. A. is jaundice from suppression; the other condition is jaundice from obstruction and reabsorption.

Achromatic (without colour) is the name applied to a combination of lenses of different kinds of glass, by which chromatic aberration (see **ABERRATION**) is overcome, and the image is presented to the eye clearly defined and free from coloured fringes. Newton, from defective experiments, was led to believe such A. combinations impossible; and it is to Dollond that we owe the first practical solution of the difficulty. See **TELESCOPE**.

Acids. The most characteristic and important properties of A. are, that they possess a sour taste, colour blue vegetable substances red, and combine with *bases* to form salts. The two first of these properties apply only to A. soluble in water, and are also possessed by some salts; the third property is common to all A., and is the most distinctive. Most A. contain oxygen, and are called in consequence *oxy-acids* or *oxacids*. These, again, are divided into *hydrated* and *anhydrous* A., according as they contain water (or the elements of water) or not.

There is a second group of A. which contain no oxygen. In them the element hydrogen is always present, hence they are called *hydro-acids* or *hydracids*: their number is small.

Many chemists of the present day take a different view of the

nature of A., and hold that hydrogen is a necessary constituent of all A.

They define an acid as a compound of hydrogen with an element, or group of elements, which yields, when treated with a metallic hydrate, water and a *salt*; the hydrogen of the acid becoming partially or wholly replaced by the metal.

On this view of the constitution of A. only the hydrated oxacids and the hydracids can be regarded as belonging to the list. The anhydrous A. cease to be called A., and receive the name of 'Acid Anhydrides.' The great advantage of this definition of A. is, that it establishes a close relation between hydrated oxy-acids and the hydracids; in fact, regards all A. from a common stand-point, and enables their reactions to be expressed in a uniform manner.

By the *basicity* of an acid is understood the number of replaceable hydrogen atoms it contains, or, on the old view of the constitution of A., the number of *equivalents* of base with which the acid can combine. Thus, hydrochloric acid (Cl) H is monobasic; sulphuric acid (SO₄) H₂ di-basic; phosphoric acid (PO₄) H₃ tri-basic. Regarding the nomenclature of A., the hydracids invariably have the prefix *hydro* or *hyd*, the suffix *ic*, the intermediate syllable being a contraction of the name of the element or group of elements with which the hydrogen is combined—thus, *hydro-chlor-ic*, *hydri-iod-ic*, *hydro-cyan-ic* A. The nomenclature of the oxy-acids is more complicated, on account of the greater number of A. one element may form on combining with different proportions of oxygen. For instance, there are four oxy-acids containing chlorine:—

Hypo-chlor-ous acid, HClO
Chlor-ous acid, HClO₂
Chlor-ic acid, HClO₃
Per-chlor-ic acid, HClO₄

The termination *ic* denotes a high stage of oxidation; *ous*, a low stage; prefix *per*, suffix *ic*, the highest stage; prefix *hypo*, suffix *ous*, the lowest.

Subjoined is a list of the most important A. :—

HYDRACIDS—

Hydrochloric acid (spirit of salt), HCl.
Hydrocyanic acid (prussic acid), HCN.

OXY-ACIDS—

(Inorganic.)

	New View.	Old View.	Anhydride, or Anhydrous Acid.
Nitric acid (aqua fortis).....	HNO ₃	H ₂ NO ₅ O ₃	NO ₂
Sulphuric acid (oil of vitriol) H ₂ SO ₄	H ₂ SO ₄	H ₂ OSO ₃	SO ₃
Sulphurous acid.....	SO
Phosphoric acid.....	H ₃ PO ₄	3H ₃ OP ₂ O ₃	P ₂ O ₅
Carbonic acid.....	CO

(Organic.)

	New View
Acetic acid.....	C ₂ H ₄ O ₂
Citric acid.....	C ₆ H ₈ O ₇
Tartaric acid.....	C ₄ H ₆ O ₆
Oxalic acid.....	C ₂ H ₂ O ₄

Acidimetry is the name given to the process for determining the quantity of free acid in a solution.

The process is based on the fact, that a certain quantity of an alkali will neutralise a definite quantity of any acid, or that an *equivalent* of the alkali neutralises an *equivalent* of an acid. See **EQUIVALENTS**. Thus—

56 grains of caustic potash (KHO), or 40 grains of caustic soda (NaHO), are equivalent to, or neutralise—
49 grains of sulphuric acid (H₂SO₄)
63 grains of nitric acid (HNO₃)
36½ grains of hydrochloric acid (HCl)
60 grains of acetic acid (C₂H₄O₂)

A solution is said to be *neutral* when it exercises no action on vegetable colouring matters. Tincture of blue litmus, if added to an acid solution, becomes reddened; if a solution of any alkali be now added to this red solution, the acid the latter contains is gradually neutralised, and when a certain quantity of alkali is added, the litmus assumes its original tint. The acid is now completely *neutralised*, and will neither colour blue litmus red nor red litmus blue: This, then, is a means of knowing when a solution of acid has been neutralised. Suppose that it is desired to determine the quantity of sulphuric acid in a solution

containing this acid in the free or uncombined state. A standard solution of alkali is first prepared. For this purpose 56 grains of caustic potash, or 40 grains of caustic soda (or equivalent quantities of the carbonate of potash or soda), is dissolved in 100 fluid grains of water.

As 56 grains of caustic potash, or 40 grains of caustic soda, neutralise 49 grains of sulphuric acid, it follows that 100 fluid grain measures of the standard alkaline solution will also neutralise this quantity of acid.

A measured quantity of the solution containing the sulphuric acid is now taken—say, 100 fluid grains—and to it a drop or two of litmus solution is added; to the red solution thus produced the standard alkaline solution is gradually poured in from an apparatus called a *urette*, which is nothing more than a glass tube graduated in such a manner as to show how many fluid grains of standard solution are being used. The addition of the alkali is continued until it is seen by the colour of the litmus that the acid is just neutralised.

Suppose that 20 fluid grains of the standard alkaline solution have been required for this purpose, the quantity of sulphuric acid is deduced by the following proportion:—

$$100 : 49 :: 20 : 9.8$$

There are, therefore, 9.8 grains of sulphuric acid in 100 grains of the solution.

In this manner the amount of any acid in a solution can be determined.

Acine'sia, a term used in medicine, meaning paralysis of motion, as distinguished from anesthesia, meaning paralysis of sensation. The paralysis may be complete or partial in both instances.

Aci Realé, an important town, province of Catania, Sicily, at the mouth of the small river Aci. It lies near the base of Mount Atna, is built of lava, and is noted for its mineral waters. The manufactures are chiefly linen, cotton, and silk; and there is considerable trade in flax, cutlery, filigree-work, and grain. In the neighbourhood is the cave of Polyphemus and the grotto of Galatea. Pop. (1872) 35,787.

Ackermann, Rudolf, born at Schneeberg, Saxony, in 1764, and finally settled in London as a printseller. He brought from Germany the art of lithography, and inaugurated with his *Forget-me-not* the once popular 'Annuaire' (q. v.) A. greatly promoted English science and art, and published many fine topographical works, including Histories of Westminster Abbey, Oxford and Cambridge Universities, and the Public Schools. He died 30th March 1834.

Ac'ne, a skin disease, characterised by the presence of small isolated pustules, with deep red bases. These pustules, after suppurating and bursting, leave behind small reddish-coloured hard tumours. A. occurs most frequently on the nose, giving rise to the appearance called 'copper nose.'

Ac'olytes, a name first used in the 3d c. to denote an inferior order of ecclesiastics who assisted the bishops and presbyters in lighting candles or tapers, in handing round the bread and wine at the communion, and whose presence was also required at the administration of the other sacraments. They ranked immediately under the sub-deacons. Since the 7th c. the offices of the A. have been performed by lay servants and boys, but the name is still retained in the Roman Catholic Church, and an aspirant to the priesthood still passes through a stage where he receives the name, and is presented with the candles and cups that marked his former duties.

Aconcag'ua, one of the highest peaks in the Andes (q. v.), 22,422 feet above the sea-level and 10,500 above the snow-line. It gives name to a province (pop. (1868) 1,130,672) and river of Chili, in which kingdom A. is situated.

Acon'itine is an alkaloid contained in the leaves of the monk's-hood (*Aconitum Napellus*). It is a white uncrystallisable substance, having a bitter acid taste. Its chemical composition is expressed by the formula $C_{20}H_{27}NO_7$. It is a virulent poison. When rubbed on the skin it causes tingling, followed by numbness, and is thus used to allay local pain, as rheumatism and neuralgia. Tincture of aconite taken in very small doses diminishes the pulsations of the heart, and is very useful in certain forms of heart disease.

Aconit'um, a genus of plants belonging to the order *Ranunculaceæ*, with peculiar irregular flowers. They are natives of Europe, Asia, and N. America.

A. Napellus, or monk's-hood, is a doubtful native of Britain. All the species, except *A. heterophyllum*, possess virulently poisonous properties. The famous Bikh poison of the E. Indies is prepared from several Indian species. The roots of *A. ferax* are used in Hindostan for poisoning arrows. When an animal, such as a tiger, is struck by one of these arrows, it generally falls dead within a few seconds. The roots of *A. Napellus* have been used by mistake for Horseradish (q. v.), with fatal results. The poisonous property of the A. depends on an alkaloid called Aconitine (q. v.) A tincture of the root is used in cases of heart disease.



Aconitum Napellus.

A'corn, the fruit of the different species of oak. The acorn-cups of several species of oak are employed for tanning. See OAK and VALONIA.

Acorus, a genus of plants belonging to the natural order *Araceæ*, or the *Arum* family. *A. Calamus*, or sweet-smelling flag, is a native of Asia, and naturalised in Europe, Britain, and N. America, where it grows by the banks of ponds and rivers. The plant, more especially its farinaceous rhizome, has an aromatic and bitterish acid taste; it has been used in medical practice as a stimulant and mild tonic. Confectioners and perfumers use the rhizome. Gin and beer are frequently flavoured with it. In Constantinople it is eaten freely during the prevalence of epidemic diseases. Formerly large quantities of it were grown in Norfolk, and sent annually to the London market; but it has now nearly disappeared. The plant very rarely fruits in this country.



Acorus Calamus.

Acos'ta, Gabriel, later **Uriel**, surnamed the 'Jurist,' the son of a Portuguese Jew who had embraced Christianity, was born at Oporto in 1594. For awhile he shared his father's enthusiasm for the new creed, but ultimately lapsed into his ancestral faith, and with his mother and brothers quitted Portugal to settle in Holland, where he submitted to circumcision, and took the name of Uriel. But he soon began to doubt Judaism, as he had doubted Christianity, and was before long entangled in controversies with the rabbis. The remainder of his life was a succession of squabbles, persecutions, and imprisonments. Finally, in an access of rage at some intolerable chastisements inflicted on him when seeking readmission to the Synagogue, he blew out his brains with a pistol, April 1647. Among his papers was found an autobiography, which Limborch printed in 1687; a new Latin edition, with a German version, appeared at Leipzig in 1847. His principal work, first published in Portuguese, and afterwards in Latin, is *Examen das Tradicoens Pharisæas conferidas con a ley Egerita* ('Examination of the Traditions of the Pharisees compared with the written Law: Amst. 1624). See Tellinck's *A.'s Leben und Lehre* (Zerbst, 1847).

Acotyle'donous Plants, applied to cryptogams, or flowerless plants, as their spores possess no seed-leaf or cotyledon. They comprehend ferns and their allies, mosses, lichens, fungi,

and sea-weeds. *Acotyledones* is the third great class of plants, according to the natural system.

Acoustics (Gr. *akouo*, I hear) is strictly the science of hearing, but it now embraces all phenomena connected with the origin, nature, forms, and perceptions of Sound (q. v.) Except as regards its applications to music, A. may be regarded as a wholly modern science. The mathematical investigation of the properties of sound dates from the time of Bacon and Galileo; and Newton first showed how the propagation of sound through any medium depends upon the elasticity of that medium. Since then the most distinguished mathematicians, such as Lagrange, Euler, and Laplace, have brought their powerful analysis to bear upon the subject. Considering the extent of our knowledge of acoustic principles, it is surprising how little they are regarded in practical life. There are many instances of halls or churches, specially intended for speaking in, of which the acoustic properties are so defective that a speaker finds the greatest difficulty in making himself distinctly heard. In some cases the sounds cause numerous and perplexing reverberations; in others they are almost completely lost on account of the height of the roof.

Acquaviva, a town in the S. of Italy, province of Bari, 16 miles S. of the town of Bari, and a station on the Bari and Taranto Railway. It is walled and ditched, has several convents and two hospitals. Pop. 6776.

Acqui (Lat. *Aquæ Statiellæ*), a walled town, province of Alessandria, N. Italy, on the N. of the Ligurian Apennines. It has a fine cathedral and many beautiful buildings. The hot sulphur springs, from which it is named, were known to the Romans, and are still a favourite resort of invalids. Pop. 6824.

Acre (A.-S. *accr*, a field; comp. Lat. *ager*, Gr. *agros*, a field) is the standard British measure for the areas of fields. Its size varies in different localities; thus the Scotch A. and the Irish A. are both larger than the English or standard A., the former in the proportion of 1:27:1, the latter in the proportion of 1:62:1. The English or standard A. contains 4 roods, 160 perches, 4840 square yards. 1-10th of an A. is called a square chain, the linear chain being 22 yards.

Acre, St Jean d', the *Accho* of the Old Testament, and the *Ptolemais* of the New Testament, a seaport on the Syrian coast, about 8 miles from Mount Carmel. The harbourage is unsafe, the harbour being shallow and exposed. Pop. estimated at from 10,000 to 15,000. A. has been the scene of many a bloody conflict. It was taken by the Crusaders in 1104, by Saladin in 1187, by the Turks in 1517, by Ibrahim Pasha in 1832, and by the English fleet in 1840. Bonaparte besieged it unsuccessfully in 1799.

Acri, a town in the S. of Italy, province of Cosenza, and 13 miles N.E. of the town of Cosenza, on the small river Macrone, lies in a fertile and beautiful district, and has a pop. of about 12,000.

Acrobat (Gr. *akron*, extremity, and *baino*, I go), a name generally given to athletes who vault, and walk or dance on a rope, slack or tight. The ancient acrobats seem to have been as skillful as the modern ones, though some of these perform feats of extraordinary difficulty and daring.

Acrogens, a division of flowerless plants, whose stems increase principally by the summit. Ferns, mosses, club-mosses, and horsetails are examples of A. The plants are *Acotyledonous* (q. v.)

Acropolis, a name applied to the citadel of many Greek cities, as Athens, Corinth, Argos, Messene, &c., because forming the 'highest part of the city.' The A. was a centre round which a population gradually collected, and was not only a stronghold, but a depository of the treasure and most valuable effects of the citizens.

Acrostic is the Greek name (*akron*, an extremity, and *stichos*, a verse) given to a poem the first or last letters of whose verses taken together form a complete word, phrase, or sentence, but most frequently a name. The invention of this species of composition cannot be traced to any particular individual, but it originated on the decline of pure classic literature. The early French poets, from the time of Francis I. to that of Louis

XIV., frequently practised it; but it was perhaps carried to its greatest perfection by the English Elizabethans. Sir John Davies has no fewer than twenty-six poems entitled 'Hymns to Astræa,' every one of which is an A. on the words 'Elizabetha Regina.' Although the invention of the A. proper may belong to post-classic times, yet traces of something analogous are found in the poetry of the Jews (e.g., the 119th Psalm), the Latins (Plautus), and the Greek 'Anthology.'

Act, in the general legal sense, denotes the formal execution and completion of any legal procedure.

Act, in the university sense, is an exercise to be done by students before taking their degree. It is chiefly in force at Cambridge as a test of the comparative merits of candidates for the degree of Bachelor of Arts who aspire to *honours*. It consists of a syllogistic discussion in Latin.

Act, in the drama, is a portion of a play during which action is supposed to be going on unseen; it is marked by the fall of the curtain. Greek plays were not so divided, action being indicated by the chorus, who occupied the stage when the other actors had left. On the Roman stage the play was divided as with us. A play seems naturally to divide itself into three parts—the exposition, the development, and the catastrophe. If this be so, it is difficult to see why five acts have come to be considered the proper number.

Act and Commission is the judicial act of the Court of Session in Scotland empowering a special commissioner to take a proof in a legal action.

Act of Bankruptcy, an ostensible proof of inability to pay a debt is so called in the law of England. The proof may be passive on the part of the debtor as well as active; thus if he allow himself to be arrested for debt he is held to have committed an A. of B. The Bankrupt Law Consolidation Act, 12 and 13 Vict., enumerates legal proofs of bankruptcy; the principle of the law being that proof of intention to delay payment of a debt, or to defraud a creditor, makes the debtor bankrupt. The equivalent term of Scotch law is 'Notour Bankruptcy;' regarding which the principle of the law of Scotland is the same as the English. See BANKRUPTCY.

Act of God is a legal expression used to signify an occurrence in which human action forms no element, such as the results of lightning. No one is bound to make good to another loss so arising.

Act of Grace, an old Scotch Act (1696) for the relief of paupers imprisoned for debt.

Act of Parliament is a bill which has been passed by both Houses of Parliament, and received the assent of the sovereign. Acts of P. are either *public* or *private* in their scope. The term *statute* is applied only to the former. A public Act affects a community; a private Act only regards a private concern. In England the law is that a statute is in force until repealed; in Scotland, again, it is held that it may become obsolete by disuse. Anciently in Scotland Acts of P. were proclaimed in towns and burghs. The Act of 1581 declares proclamation at the cross of Edinburgh sufficient. But no promulgation is now required for an A. of P. to become binding, which it does from the date of passing, unless it be otherwise provided by the Act itself. By the Act 13th Vict. provisions are made for the forms of bills submitted to Parliament. There is, the title, the preamble, the enacting sections and clauses, and, if required, the forms and schedules for working the Act.

Three volumes preserved in the Court of Exchequer contain the earliest Acts of the English Parliament—the first containing the Acts before the reign of Edward III.; the other two, those from Edward III. to 7th of Henry VIII. They are all well written. The printing of Acts began in the reign of Richard III. Between 1810 and 1824 ten volumes were printed containing the whole Acts of the English Parliament to the end of the reign of Anne.

Act of Settlement is the title given to the statute 12 and 13 Will. III. c. 2, which regulates the succession to the throne of Great Britain. Immediately after the Revolution of 1688, Parliament had passed an Act by which the succession was barred to Roman Catholics, or to any one married to a Roman

Catholic. The same Act settled the crown on the issue of Queen Mary, Queen Anne, and King William, but made no further provision. This becoming necessary by the death of Anne's son, the Duke of Gloucester, led to the passing of the A. of S., settling the crown upon the line of Elizabeth Queen of Bohemia, daughter of James I. of England. Elizabeth and her daughter Sophia, Electress of Hanover, having died before Queen Anne, the son of Sophia succeeded as George I., who was succeeded by his son George II., predeceased by his eldest son Frederick Prince of Wales, father of George III., father of George IV. and of Edward Duke of Kent, the father of Queen Victoria. The inheritance, formerly absolute, is now conditional, being limited to the heirs of Elizabeth daughter of James I., being Protestants, married to Protestants, and members of the Church of England.

Act of Toleration. This title is especially given to the Act 1 William and Mary, c. 18, confirmed by 10 Anne, c. 2, by which all persons in England dissenting from the Established Church, except Roman Catholics and those denying the Trinity, are allowed religious freedom. In Scotland the Act allows all sectarians to meet for religious services, imposes a penalty on any one disturbing them, and allows the Episcopalian clergy to celebrate marriages. The progress of religious toleration since the reign of Anne has been slow but steady. 53 Geo. III. c. 160, removes the disability of those denying the Trinity; 9 Geo. IV. c. 17, freed Protestant dissenters from the fetters of the Test and Corporation Acts (q. v.); 15 and 16 Vict. c. 36, allows them to register their churches, births, deaths, and marriages with the Registrar-General, freeing them in these matters from the supervision of the Church of England.

Roman Catholic disabilities were in full force in England, and in still greater force in Ireland, in the earlier years of the reign of George III. The American war extorted some concession from government in the latter country; in England the severer penalties were greatly mitigated in the reign of Geo. III.; while 10 Geo. IV. c. 7, commonly called the Roman Catholic Emancipation Act, admitted the members of that faith in England and in Ireland to almost full civil rights. Liberal progress has been continued in the present reign, and 21 and 22 Vict. c. 59, may be said to have completed the work of religious emancipation.

Act of Uniformity is the title of 13 and 14 Car. II. c. 4. It enacts that the revised Book of Common Prayer be used in the parish churches of England, and that the schoolmasters subscribe a declaration of conformity to the Liturgy. It also required a declaration by the clergymen before the congregation of assent to the doctrine and ordinances of the Book of Common Prayer, the penalty of refusal being loss of ecclesiastical status. Immense numbers of the clergy were thus deprived of their livings. 9 and 10 Vict. c. 59, repealed a provision of the Act requiring schoolmasters to get a licence from the ordinary to entitle them to teach privately.

Acts of the General Assembly of the Church of Scotland are binding on all members and judicatories of that Church. See GENERAL ASSEMBLY.

Acts of Sederunt are rules made by the judges of the Court of Session in Scotland for the conduct before them of civil and criminal business. The original power of the court to make these rules is derived from a Scotch statute passed in 1540. More explicit powers are given to the court under comparatively recent statutes; but Acts passed in virtue of these require, with a few exceptions, to be laid before Parliament within a limited time. Nine judges are a quorum in passing an Act of S.

Acta Diurna, the name of a Roman publication resembling our newspaper, being a daily record of public affairs. Under consulship of Julius Cæsar it gave an account of the proceedings of the Senate. Under Augustus this was stopped.

Acta Eruditorum, the title of one of the oldest and most celebrated literary and scientific journals, begun at Leipzig January 1682. The last volume is for 1776. A work on similar principles, called *Account of Books and Transactions of the Learned World*, was begun in Edinburgh in 1688. See *Watt's Bibliotheca Brit.*

Acta Sanctorum, the collective title of all the old records that have come down to us concerning the saints and martyrs of the Greek and Latin Churches. The beginnings of this branch of ecclesiastical literature are the *Acta Martyrum*, or accounts of the trials, condemnation, and execution of the early Christians in the times of persecution. The greater part of these, however, were destroyed by an edict of Diocletian, A.D. 303, and the rest perished during the inroads of the barbarians in the 5th c. When the Christian religion became dominant, many people found a pleasure in collecting the fragmentary notices of the martyrs still extant, or the more picturesque oral traditions of the times in which they lived. Examples of such collections are the *Martyrologies* or *Menologies* of the Pseudo Hieronymus, Bede, Rabanus Maurus, &c., the *Martyrologium Romanum*, the *Menologium Græcorum*, and the *Martyrologium Ecclesiasticum Germanicum*. By far the most famous collection, however, of the kind, and the one to which the name A. S. has been specially given, is that undertaken by the Bollandists (q. v.), a society of learned Jesuits at Antwerp. This vast work, begun in 1643, and not yet finished, though it had reached in 1868 the month of October in the ecclesiastical year, contains the entire literature of the subject, and is not only a colossal monument of human industry, but, within certain limits, is marked by careful and even critical treatment.

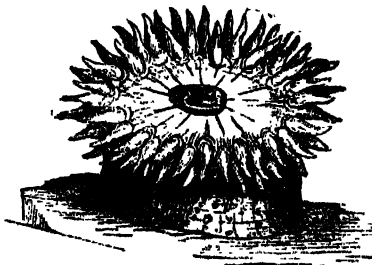
Actæa, a genus of plants belonging to the natural order *Kanunculaceæ*, so called from the fancied resemblance of their leaves and fruit to those of the elder, in Greek *akta*. *A. spicata*, or baneberry, is the only species native in Britain, being found in the limestone districts of the N. of England. Its berries are black and poisonous. Its root has been used with good effect in nervous disorders. Two American species are grown in our gardens. About Lake Huron they are considered valuable medicines by the natives, especially as a remedy against the bite of the rattlesnake, hence they are sometimes called rattlesnake herbs.



Actæa spicata.

Actæon, grandson of Cadmus, and trained to hunt by Cheiron, was torn to pieces by his own dogs—Diana, whom he had surprised while bathing, having changed him into a stag.

Actinia, a genus of interesting marine animals closely allied to the sea-nettles (*Acalephæ*). The popular names given them are *animal-flowers* and *sea-anemones*, from their resemblance to flowers when they are fully expanded. They are found on the rocks by the shores of every sea. In Britain there are many beautiful species, but those of tropical regions surpass them in gorgeous brilliancy. The *A. Jordaica*, a deep crimson species of the Mediterranean, is esteemed a delicacy by the Italians. Dr M'Bain, at Trinity, near Edinburgh, has an A. called 'Grannie,' *Mesembryanthemum*, which has lived in a glass tumbler for fifty-one years, having been taken from the Firth of Forth at North Berwick in August 1823, by the late Sir John G. Dalyell.



Actinia.

Actinism is the property possessed by certain solar rays (hence called *actinic rays*) of producing chemical effects. See SPECTRUM.

Action, in its legal sense, means a judicial proceeding, criminal or civil. Civil actions are 'real,' 'personal,' or 'mixed.' The first demands restitution of property, the second damages for wrong sustained, the third demands both. In the equity courts of England the word 'suit' is used to denote the litigation; 'A.' being only applied to procedure at common and statute law. The function of an equity court in England is to consider the circumstances of the individual case, and, so far as legal principle permits, to do what is equitable in it. In Scotland, again, there is no distinction between law and equity in the legal administration. While in both countries any one who has been actually wronged may seek redress from the law, the law of Scotland has this advantage, that any one having a latent right may have it *declared*—that is, established—by law, even though no one is denying the right. The danger of lapse, or lapse of proof, by time is thus averted. The necessary A. is called 'A. of declarator.' There is no analogous procedure in the law of England, though endeavours have been made to introduce it.

Action, Principle of Least, is a law of motion first given by Maupertuis, and afterwards extended by Lagrange. It may be enunciated thus: 'The integral of the product of the kinetic energy (see ENERGY) of a system and the element of time is a minimum,' or in analytical language, $\delta \int 2mv \, dt = 0$.

Varying Action is a remarkable extension of the above by Sir W. R. Hamilton of Dublin, and consists in an investigation of the integral when it is not a minimum.

Actium (now *Asio*), a town and promontory at the entrance of the Ambraciot Gulf (Gulf of Arta), near which Octavian (afterwards Augustus) defeated Antony and Cleopatra in the famous sea-fight of September 2, B.C. 31. The defeat was owing mainly to the flight of Cleopatra with the Egyptian fleet. Antony, infatuated by his passion, followed her with several ships, and in a few days his land forces surrendered to Octavian. On the promontory was a temple of Apollo, where a festival had formerly been celebrated in honour of that god. Grateful for his victory, Augustus enlarged the temple and revived the festival, which was observed quinquennially. He also founded, on the opposite coast of Epirus, Nicopolis (city of victory).

Acts of the Apostles, the earliest historical record of the Christian Church, forming part of the literature of the New Testament, announces itself as the work of the same person who wrote the third Gospel, who is believed to be 'the beloved physician' of Col. iv. 14, and whom tradition (*Nicéphorus*; Cent.) declares to have been a painter also. The style of both treatises is similar, even to the usage of particular words, and no one, in early times, except the Marcionites and Manichæans, is known to have denied either its authenticity or its genuineness. Baur, the head of the Tübingen School, however, has tried to show that instead of being an unsophisticated narrative of the more important facts regarding the spread of the gospel, it is a partisan effort of the Pauline party in the 2d c. to vindicate their Master and his principles at the expense of the apostle Peter. But this view, though urged with much critical subtlety, has not established itself, and the book still keeps its ground as an evangelical product of the apostolic age.

Actuary. In ancient Rome the *actuarii* were the recorders of the *Acta* of the Senate and corporations. In recent times, the development of the business of life assurance has originated a distinct profession, whose special function it is to calculate the monetary results of the combined elements of rate of interest, the laws of probability, and age, with reference to the expectation of life. See LIFE, EXPECTATION OF. The members of this profession are called actuaries. Many other questions, however, besides those connected directly and indirectly with duration of life come within the scope of the profession; all practical questions do whose solution requires mathematical knowledge of the Laws of Probability (q. v.)

Acupressure. By this term is meant the occlusion of an artery, by means of the pressure of a needle in such a way as to arrest the flow of blood through it or bleeding from it. The method was introduced by the late Sir James Simpson, Bart., as a substitute for the ligature usually employed, but has now been abandoned by almost all surgeons. See WOUNDS and ANTISEPTICS.

Ad'a, a town of the Austro-Hungarian empire, in the Woiwodina, on the river Theiss, 8 miles S. of Zenta. Pop. 9350.

Adafu'dia, a town of Sudan, Central Africa, in the Fellatah country, about 400 miles S.E. of Timbuktu, and 150 miles W. of the Niger. A considerable slave-trade is carried on here. Pop. about 24,000.

Adagio (Ital. slow, lingering), a musical term used to signify a very slow rate of movement. It comes between 'grave' and 'andante,' and is nearly equivalent to 'largo' and 'lento.' The second part or movement of a sonata or symphony is very frequently in this time, thus forming an effective contrast to the first movement, which is commonly an 'Allegro' (q. v.) In speaking of such a movement, the word A. is used as a substantive, as 'the A. of the Sonata Pathétique,' &c.

Adal, or **Adel**, the Arabic name given to the sterile maritime country between Abyssinia and the Red Sea, extending as far S. as the Somauli country.

Adalbert (of Prague), the apostle of the Borussi (mod. Prussians), was the son of a Bohemian nobleman, and was born in 956 A.D. Educated at Magdeburg, he was made Bishop of Prague in 983, but his zeal for religion, and his rigid attachment to the usages of the Romish Church, involved him in quarrels with his half-pagan countrymen, in consequence of which he quitted his diocese for a monastic seclusion in Italy. Recalled to Bohemia in 993, he was forced to leave again within two years, and after visiting Germany, and the monasteries of Tours and Fleury in France, he went to Poland, where he conceived the idea of converting the heathen Borussi. At Danzig he baptized his first converts, and thence passed into E. Prussia, where, however, he was assassinated by a pagan priest on his second attempt to preach the gospel, 23d April 997. Boleslav Duke of Poland, it is said, ransomed his corpse with its weight in gold, and brought it to the metropolitan church at Ensen, where it was reported in later times to have worked miracles. A.'s 'day,' as a saint and martyr, in the calendar of the Church, falls on the 1st of June.

Ad'am, the name given in Scripture to the first man. The word conveys in Hebrew the sense of 'redness,' and may have reference to the earth (Heb. *adamah*, Gen. ii. 7) from which he was formed. (*Edom*, i.e., the 'red' desert region, is but another form of the name.) In Gen. ii. 23, considered by some scholars to be part of a later narrative (see GENESIS and PENTATEUCH), A. calls himself *Ish*, i.e., 'one of substance or worth.' The biblical tale is familiar to every one. The Tal mudists have spoiled its simple beauty by their tasteless exaggerations. According to them, A. was at first a hermaphrodite; his head reached the heavens, and the splendour of his countenance outshone the sun. He inspired the argels themselves with fear, and all created things hastened to do him reverence. But the Lord, wishful to show his superior power, caused a deep sleep to fall upon A., during which he took away, by a curious process, his colossal stature. His first wife was Lilith (i.e., the 'night-spectre'), the mother of the demons, who fortunately fled off through the air. After her departure, the Lord formed Eve from a rib of A., and brought her to him superbly appareled. The angels descended and played around them upon heavenly instruments; sun, moon, and stars danced in their courses. But the envy of the angels was now excited, and one of their number, the seraph Sammael, seduced Eve from the paths of innocence. She and her husband were immediately driven out of Paradise, and forced to wander over the face of the earth. According to the Koran, all the angels did reverence to A. except Eblis, who was in consequence expelled from Paradise, which received A. in his place. Here Eve was created. In revenge, Eblis seduced the pair, who were then driven down to earth and separated. But after a time God had compassion upon A., and sent the archangel Gabriel to teach him the divine law, which he faithfully followed, and as a reward had Eve restored him on Mount Ararat, after the lapse of 200 years. See Eisenmenger's *Entdecktes Judenthum* (Frankf. 1700), and Herbelot's *Bibliothèque Orientale* (Par. 1697).—In the New Testament theology A. appears as the federal head or representative of the human race in the covenant of works which God made at the creation.

Ad'am (of Bremen), an old German chronicler and geographer, was a native of Upper Saxony, and was called to

Bremen in 1067 as canon of the cathedral and *magister scholarum*. He died in 1076. His chief work is the *Historia Ecclesiastica Hamburgensis et Bremensis vicinarumque Locorum Septent. ab Anno 788, ad 1076*. It is a storehouse of information about the affairs of his own diocese, and of the northern countries, Denmark, Sweden, and Russia, visited by the devoted missionaries of the north. In reference to the Slavic peoples it is especially valuable. The work was first printed by Velleius (Cop. 1579) from a MS. discovered in the monastery of Sorø; the best edition is that of Pertz, in the *Monumenta Germaniæ Historica*.

Ad' am, Albrecht, a celebrated German painter of animals and battle-scenes, was born at Nordlingen 16th April 1786, and died at Munich 28th August 1862. His principal works are a series of pictures representing scenes in the French campaign in Russia, of which he was an eyewitness; a splendid series of lithographs (120 in number), entitled *Voyage pittoresque militaire*; portraits of the King of Würtemberg on horseback, and of his finest Arabian steeds; the battle of Moscow, for King Ludwig of Bavaria; the battles of Novara and Custoza, in the Austrian campaigns against Sardinia; and the famous fight of Zorndorf for the Maximilianeum at Munich shortly before his death. There is a wonderful life, clearness, and artistic accuracy about his pieces. As a horse-painter, in particular, he had no equal among his contemporaries. Four of his ten children became painters, and have won celebrity—Beuno and Franz in the same style as their father.

Ad' am, Alexander, LL.D., a celebrated Scotch teacher and scholar, was a native of Rafford parish, in the county of Elgin, and was born in 1741. He was educated at the University of Edinburgh, became head-master of Watson's Hospital, in the same city, in 1761, and seven years later was appointed rector of the Edinburgh High School, a situation which he held till his death, December 18, 1809. A. was a man of high character and liberal thought, not uninfluenced by the republican sentiments that sometimes flow from a classical culture. He was, moreover, an educational reformer, and his efforts to infuse animation and reality into the study of Latin, though much opposed by the municipal authorities, and sometimes frustrated, conferred a renown on the school which it has never since lost. His best known production is his *Roman Antiquities* (1791; transl. into German by J. L. Meyer; Erlang. 1806; 2d ed. 1812; and into French; Par. 1818), a work which has fallen into disuse since the appearance in later times of larger, more accurate, and more searching treatises, but which was long the best thing of the kind either in England or Scotland. He was also the author of a *Summary of Ancient Geography and History* (1794), *Classical Biography* (1800), and a *Compendious Dictionary of the Latin Tongue* (1805).

Ad' am de la Halle, surnamed *le Boçu d'Arras* (the Hunchback of Arras), a *trouvère* of the 13th c., was the son of a citizen of Arras, and died at Naples about 1287. For the amusement of the Neapolitan court he composed, shortly before his death, *Li Jeu de Robin et de Marion*, a pastoral operatic comedy, which is printed in the *Mélanges de la Société des Bibliophiles Français* (Par. 1822). Other productions of A.'s are, *Li Jeu d'Adan*, *Li Congit d'Adan d'Arras*, *C'est du Roi de Sicile*, and a number of songs and rondeaux, which may be found in Roquefort; *État de la Poésie Française aux douzième et treizième Siècles*. Like most of the poets of his age, A. composed the music for his works, and followed the notation invented by Arezzo. The *Li Jeu de Robin et Marion* is the oldest comedy of modern Europe; it is a real operatic work, is divided into scenes, has the dialogue interrupted with music, and has eleven *dramatis personæ*. It gives A. a claim to be considered one of the founders of the French theatre.

Ad' am, Melchior, a German scholar and writer, born in Silesia about the middle of the 16th c., became rector of the College of Heidelberg, and died in 1622. His chief works are, *Apographum Monumentorum Heidelbergensium; Parodia et Metaphrasæ Horatiana; Vita Germanorum Philosophorum; Decades duæ, Continentes Vitæ Theologorum exterorum Principum*. Moreri and Bayle, the great encyclopædists, made liberal use of the writings of this laborious author.

Ad' am, Robert, architect, born at Edinburgh in 1728, and educated at the university there. He proceeded to Italy in 1754,

and thence to Spalatro in Dalmatia, where he made drawings of the ruins of Diocletian's palace. These he published in 1763, on his return to England, under the title *Ruins of the Palace of the Emperor Diocletian at Spalatro, in Dalmatia*, a magnificent work, containing 71 plates. He soon acquired such distinction in his profession that he was appointed architect to the king. In conjunction with his brother James, he executed many public and private buildings, among which are Caenwood House, Luton House; the Register House, the University buildings, and St George's Church, in Edinburgh; the Glasgow Infirmary, the Adelphi buildings, London, the gateway of the Admiralty, &c. His designs, though marred by a fondness for minute ornamentation, exhibit good and even elegant taste. In 1768 he was returned to Parliament for Kinross-shire. He died 3d March 1792, and was buried in Westminster Abbey, in which there is a tablet to his memory.

Ad' amites, or **Adam'ians**, an ecclesiastical sect of the 2d c., of Gnostic tendencies, who sought to bring back the state of innocence that existed before the Fall by abstaining from all sensual gratifications. They rejected marriage, went about naked, &c., but soon got involved in moral confusions, which ended in a worse licentiousness than that against which they had originally testified. In the 15th c. a fanatical sect of the same name appeared in Bohemia and Moravia. They also called themselves Picards (from their founder, Picard), and 'Brethren of the Free Spirit.' Among other wild crotchets, they declared for the abolition of the priesthood and a community of wives. Both Hussites and Catholics naturally disliked them, but in spite of great persecution from both parties they managed to survive, and as late as 1849, when the edict of religious toleration was issued by the Austrian government, some A. reappeared and actually began to proselytise.

Ad' amnan, or **Adomnan**, an Irish saint and ecclesiastic, best known as the biographer of St Columba, was born in Donegal about A.D. 624. He belonged to one of the great families in the N. of Ireland, and in consequence exercised considerable influence in secular as well as ecclesiastical affairs. At the age of fifty-five he was chosen abbot of Ily or Iona, and ruled that famous monastery for twenty-five years. It cannot, however, be said that his rule was a success, for during one of his visits to Aldfrid King of Northumbria, whose acquaintance he had made in Ireland, he became converted to the Roman view of the true time for celebrating Easter, and provoked bitter opposition among the Scoto-Irish clergy by seeking to introduce the foreign usage on his return to Iona. The last years of his life were spent mainly in Ireland, but he died in Iona A.D. 704. A.'s *Vita Sancti Columbae* ('Life of Saint Columba') is a work of great value for the light which it throws on the dark Pictish times, which were soon after again swallowed up in gloom, and on the peculiarities of that Scoto-Irish Christianity which was partially independent of Rome. It was first printed at Ingolstadt in 1619, but the latest and best edition of the work is that executed by Dr Reeves in 1857 for the Bannatyne Society of Edinburgh and the Irish Archaeological Society, and which, with an English translation, forms (1875) the 6th volume of the admirable series of *Scottish Historians* in course of publication by Edmonston and Douglas (Edinb.). A. also wrote, from information furnished to him by a French bishop, an account of the Holy Land, which is the earliest we possess belonging to the dark ages.

Adam's Bridge, a spit of shoal, 60 miles long, reaching from the peninsula of Hindostan to Ceylon. There are two openings in the barrier, but these only allow small craft to pass.

Adam's Needle, the popular name for *Yucca* (q. v.).

Adam's Peak, a mountain in the S. of Ceylon, 7420 feet high. On the platform at the summit of the granite peak there is a deep impression like that stamped by a monster foot, which is an object of curious tradition. The Mohammedans believe that after Adam was expelled from the garden of Eden, he did penance on this spot by standing on one foot for a thousand years. The Buddhists regard the indented mark as the *Sri-pada*, or holy footprint of Buddha. The place attracts immense numbers of pilgrims.

Adams, John, second president of the United States, was born at Braintree, Massachusetts, October 19, 1735, educated at Harvard College, and afterwards qualified himself for the bar.

He removed to Boston in 1765, and soon acquired a high professional reputation. He was a member of the congress which met at Philadelphia in September 1774, and strongly supported Jefferson and Lee in their proposal for total separation from the mother country. In November 1784 A. signed the preliminaries of a peace with Britain, and was American minister in London in 1785. There he published his *Defence of the Constitutions of Government of the United States* (1787). In 1789 he was elected vice-president of the United States, and president in 1797. The latter part of his life was devoted to agriculture and literature, and he died 4th July 1826.

Adams, John Couch, astronomer and mathematician, born near Bodmin, June 5, 1819. Entering St John's College, Cambridge, he was senior wrangler in 1843, and afterwards fellow and tutor. In 1841 he began to investigate the irregularities of the motion of Uranus, which in October 1845 he showed to be caused by an unknown planet within a definite range. Le Verrier's announcement of the same import was made on the 10th of November following. The discoveries being independent, the Royal Astronomical Society gave each a printed testimonial, instead of awarding its gold medal to either. In 1858 A. became Lowndean Professor of Astronomy at Cambridge.

Adams, John Quincy, sixth president of the United States, and son of John Adams the second president, was born at Braintree, Massachusetts, 11th July 1767. While but a youth he accompanied his father to Paris, where he acquired a thorough command of the French language, which in his subsequent career proved of great importance to him. After graduating at Harvard College he devoted himself to legal pursuits, and to writing for the press. He was sent as minister to the Hague in 1794; was minister at Berlin 1800-1801; and in 1803 was elected to the Senate of the United States. After being for some years professor of rhetoric in Harvard College, he was in 1810 appointed by Madison minister to Russia, whence he was transferred in 1815 to London. In 1817 he was appointed secretary of state, and obtained the presidency in 1825. From 1830 till his death, 23d February 1848, he was a member of the House of Representatives, and latterly an uncompromising advocate of the abolition of slavery. From a party point of view, his political career was somewhat shifty, but he was much superior in knowledge and intelligence to the majority of American statesmen. See *Memoirs of John Quincy Adams*, the first two vols. of which appeared in 1874 (Philadelphia, Lippincott & Co.)

Adams, Samuel, a prominent leader in the movements that led to the separation of the American colonies from Britain, born at Boston, U.S., 27th September 1722. He graduated at Harvard in 1743, became a member of the legislature in 1766, and ten years later signed the Declaration of Independence. From 1789 to 1794 he was lieutenant-governor of Massachusetts, governor for the succeeding three years, and died at Boston, 2d October 1802. A. was an eager, passionate, obstinate republican, who won and deserved the title of the American Cato.

Adamson, Patrick, a notable Scotch ecclesiastic and an elegant scholar, born in Perth 1543. He studied at St Andrews, became minister of Ceres in the Reformed Church, passed some years on the Continent as tutor to the son of Macgill of Rankellor, one of the Lords of Session, escaping with difficulty from the massacre of St Bartholomew, and returned to Scotland in 1570 to find a party among the nobles bent on keeping up Episcopacy in the Kirk of Knox. The remainder of his career is part of the ecclesiastical history of the time. Appointed minister of Paisley by the General Assembly, he soon after (1577) amazed his brethren by accepting from the Regent Morton the yet unabolished office of Archbishop of St Andrews, and henceforth was almost at open war with the General Assembly, of which, however, till his excommunication, he continued to be a member. His shifty, unprincipled, and worldly policy closed in disaster and misfortune. King James neglected him in his later years, and bestowed the revenues of his see on a favourite. Driven to despair by debt, disgrace, and misery, he sent a 'recantation' of his anti-Presbyterian policy to the Synod of Fife; the excommunication was taken off, but he died in the first stages of his humiliation, February 19, 1592. A collection of the best of A.'s writings was published by his son-in-law, Thomas Wilson (Lond. 1619). As a Latin poet he may almost rank with Buchanan or Melville.

Adana, the capital of a Turkish vilayet of the same name, Asia Minor, on the river Seihun, 120 miles N.W. of Aleppo. It

was founded by the caliph Haroun al Raschid, on the site of the anc. *Antiochia ad Sarum*, and commands the passes of the Taurus mountains. It is now a chief place of trade between Syria and Asia Minor. Pop. 30,000, mostly Turks.

Adanson, Michel, an eminent French botanist of Scotch extraction, born at Aix in Provence 7th April 1727, studied his favourite science at Paris under M. M. Jussieu, sailed for Senegal in Africa when only twenty-one years of age, and after a five years' residence returned to Europe with a valuable collection of specimens in natural history. In 1757 appeared his *Histoire Naturelle du Sénégal*, and in 1763 his *Familles des Plantes*, in which he endeavoured unsuccessfully to supersede the Linnæan system of classification. His proposal (1774) to the Académie des Sciences of an immense encyclopædic work on his peculiar method of classification was not adopted, and the rest of his life was spent in solitary speculation, and in amassing materials for a work that was never to be finished or even published. He died at Paris 3d August 1806. See Cuvier's *Éloge d'Adanson* in the *Recueil des Éloges Historiques*, &c. (Paris, 1819).

Adansonia, a genus of trees belonging to the natural order *Bombacæ*. There are only two known species. *A. digitata*, the baobab, sour gourd or monkey-bread, common in several parts of Africa. Its stem is short, but grows to a great thickness. It has been spoken of as 'the tree of a thousand years,' and 'the oldest organic monument of our globe.' Adanson, whose name the genus bears, and who travelled in Senegal in last century, met with two trees, one of which was 30 feet in diameter, and which he supposed to be 5150 years old. Livingstone says, 'I would back a true *moavana* (the native name for it at Lake Ngami) against a dozen floods, provided you do not boil it in salt water; but I cannot believe that any of those now alive had a chance of being subjected to the experiment of even the Noachian deluge.' The wood of the baobab is soft, but the inner bark yields a strong fibre. The stems often become hollow, owing to the attack of a fungus, and within these hollows the natives suspend the bodies of those who are refused the honour of burial. *A. Gregorii* is a native of N. Australia, and is called the cream-of-tartar tree from the agreeable acid taste of its fruit.



Adansonia digitata.

Adda (Lat. *Aldua*), a river of Lombardy, rises in the Rhætic Alps. After flowing through Lake Como, it crosses the plain of Lombardy, passes Lodi and Pizzighetone, and about 8 miles above Cremona joins the Po.

Adda, a small lizard found in the East. It is supposed to be efficacious in cases of cutaneous diseases, to which Arabs and Egyptians are very subject.

Adder, a venomous reptile of the serpent kind. See VIPER.

Adder's Tongue, the English name of a small British fern, *Ophioglossum vulgatum*.

Addiscombe. See CADET.

Addison, Joseph, the most exquisite of English essayists of society, the founder of our periodical literature, and a poet of graceful genius, was the son of the Rev. L. Addison, Dean of Lichfield, and was born at Milston in Wiltshire, 1st May 1672. Sent to the Charterhouse School, London, he there, as a boy, made the acquaintance of Steele, afterwards his coadjutor on the *Tatler* and *Spectator*. At fifteen he entered Oxford, where he signalled himself by the peculiar excellence of his Latin verse, and graduated M.A. in 1693. Having secured the patronage of Lord Keeper Somers, and obtained a pension of £300 a year, he travelled in Italy for two years, returning to England in 1703. During his residence in Italy, he penned his poetical *Letter to Lord Halifax*, in which his classic enthusiasm gives an unwonted ardour to his verse. In 1704 he wrote *The Campaign*, a poem addressed to the Duke of Marlborough, celebrating

his 'famous victory' of Blenheim, became member of parliament for Malmesbury in 1708, and so rapid and fortunate was his public career that in 1717 he was appointed secretary of state. In the previous year he had married the Dowager-Countess of Warwick—a union which did not yield him any happiness. He died at Holland House 17th June 1719. A. commenced to write for the *Tatler* in 1709, and for its successor the *Spectator* in 1711. His tragedy of *Cato*, produced in 1713, met with unbounded success. Whigs and Tories vied with each other in the enthusiasm of their admiration. The work seemed immortal, but is long since dead. A. is also the author of an unfinished work on *The Evidences of the Christian Religion*, and of numerous pamphlets, poetical epistles, and political articles. Of his poetry one or two sacred pieces will endure as long as the language; but it is as an essayist that he maintains his place among the illustrious of English authors. For humour, exquisite in ingenuity, playfulness, and poetic grace; for satire, incisive as it was wise and wholesome; and for a moral influence powerful enough to elevate the tone of social intercourse even of his own day, the essays of the *Spectator* remain unsurpassed. The most complete edition of A.'s works is Greene's (6 vols., New York and Lond. 1854). See also *The Life of A.* by Miss Lucy Aiken (2 vols. Lond. 1843).

Addison's Disease. This name is given to a peculiar form of disease first described by Dr Addison of London. It is characterised by anæmia, or a deficiency of the coloured corpuscles of the blood, great and progressive debility, loss of appetite, faintness, flabbiness of the muscles, and a peculiar brownish or dingy discoloration of the skin. It is associated, though not invariably, with disease of the supra-renal capsules, two small ductless glands placed in close proximity to the kidneys. A.'s D. is invariably fatal, and is not amenable to any known treatment.

Addition is a mathematical operation by which two or more quantities are put together so as to form one new quantity, which is said to be the *sum* of the original quantities. In arithmetic the distinctive mark of A. is + (plus). In algebra, however, there is an extension of meaning, not only +, but also - (minus) being employed; and these two signs are connected by the law, $+ a - a = 0$; or if + a be added to - a, the result is zero.

Adelaer, Cort Sivertsen, a famous admiral, born 1622 at Brevig in Norway, entered the Dutch navy at the age of fifteen, and subsequently fought for the republic of Venice against the Turks. On one occasion near the Dardanelles in 1654, A. won a most brilliant victory over the Ottoman fleet. With a single ship he broke a line of 65 galleys, sent 15 to the bottom, burnt several others, and destroyed about 5000 of the enemy. In 1661 he left the Venetian service. Frederick III. of Denmark, who made him a splendid offer in respect of salary, obtained his services in 1663, and in 1675 he was appointed admiral-in-chief of the Danish fleet, but died at Copenhagen in the same year.

Adelaide, the capital of S. Australia, founded in 1836, lies on both banks of the river Torrens, about 7 miles E. of the Gulf of St Vincent, in $34^{\circ} 45'$ S. lat., and $138^{\circ} 26'$ E. long. It is built on a sandy plain, and walled in on the E. and S. by the Mount Lofty range (2100 feet). The streets run at right angles, and are broad and well kept. A. possesses a number of handsome public buildings, chief among them, in addition to those occupied by the governor, the legislature, and government departments, being the South Australian Institute and the Hospital, and several other charitable institutions. The number of churches is remarkable. A. is lighted with gas, and well supplied with water from reservoirs several miles distant. It has beautiful botanical gardens, and is surrounded by a public demesne half a mile wide, called the Parklands. A. supports four daily and nine weekly newspapers, besides several monthly publications. It is a see of the Anglican and Roman Catholic Churches. An Anglican cathedral was consecrated in 1878. Pop. (1873) 29,000.

Adelsberg, a market town of Carniola, 22 miles N.E. of Trieste, in the vicinity of which is the largest stalactite cavern in Europe. This cavern is of double form, the larger chamber being 8550 feet long, fretted with beautiful stalactites, and resonant with the music of a rapid stream. The cavern is in the care of guides, who show it by torchlight.

Adelung, Johann Christoph, a once notable philologist, born in Pomerania 8th August 1732, studied at Halle, became a professor at Erfurt 1759, and librarian at Dresden 1787, where he died 10th September 1806. He is best known by his *Mithridates oder Allgemeine Sprachenkunde*, only one volume of which he lived to publish. Three additional volumes were added by Vater (1809-17). Other works of A., of much use in their day, though now superseded, are his *Versuch eines vollständigen grammatisch-kritischen Wörterbuchs der Hochdeutschen Mundart* (Leipz. 1774-86; 2d ed. 1793-1801), and *Adelre Geschichte der Deutschen, ihrer Sprache und Literatur*.

Aden, a free port and peninsula in the S.W. of Arabia, at the base of a mountain range which rises to the height of 1776 feet. It was called Aden or Eden (Paradise) by the Arabs, because of its rich trade and splendid climate. The town lies in a hollow formed by the vast crater of an extinct volcano, and has capital harbours. It was a flourishing entrepôt in the ancient commercial world, being known to the Greeks and Romans under the name of Adana or Athana. The town played an important part under the Himyarite, Abyssinian, and Sassanide dynasties, was long the capital of Yemen, and the greatest emporium in Arabia for the products of Southern Asia and E. Africa. It first began to decline under Turkish rule (1538-1630), and continued to do so under all changes, until it passed into the hands of the British in 1839. It is now a strong garrison, a coal-depôt for Indian steamers, and a station of the Indo-European telegraph line. It is rapidly increasing in trade and population. An extensive range of rock-cisterns was lately discovered, capable of holding 30,000,000 galls. In 1876-77 the sea-borne trade was valued at £5,000,000, not including mere transshipments. Area of settlement, 11 sq. miles; pop. (1877) 19,289.

Adenantha, a genus of leguminous plants, principally indigenous to India. *A. favonina* is a large E. Indian tree, from the wood of which a dye is obtained. The Brahmans use the dye for marking their foreheads after their ablutions. The seeds of the tree are bright scarlet, and are used by jewellers in the East as weights, each seed being very uniformly four grains. They are sometimes used for food, or made into bracelets and other ornamental articles.

Adenitis, inflammation of a lymphatic gland. It usually proceeds to suppuration and destruction of the gland. It is common in the cervical glands of children while recovering from eruptive fevers, more especially in those of a strumous habit of body. Inflammation of the glands of the groin frequently follows venereal disorders, and is then termed a bubo.

Adenoma, a tumour of the mammary gland, consisting of an hypertrophied condition of the proper gland structure. The term is also sometimes applied to any tumour formed by hypertrophy found in lymphatic glands.

Aderno (anc. *Adranum*), a town of Sicily near the river Simeto, 17 miles N.W. of Catania. It lies at the foot of Mount Etna, and is built chiefly of lava. Convents and nunneries abound in the place. Pop. 13,000.

Adhesion is a kind of attraction subsisting between two separate bodies, by which they tend to remain attached to each other when their surfaces are brought into contact. The most interesting cases are those with respect to solids and gases, which latter become so condensed that in many instances their chemical action is increased. Thus oxygen is so condensed on the surface of spongy platinum, that it will unite at once with hydrogen to form water without the application of heat.

Adhesion, a term employed in pathology to express the union between two cut surfaces or between two membranes by the effusion of lymph between the opposed surfaces. The kind of lymph necessary is called plastic or fibrinous, because it tends rapidly to become developed into connective tissue, and to be supplied by blood-vessels. Thus the parts become firmly and permanently united.

Adiabatic Lines are curves which express the relation between the pressure and volume of a gas of given mass, the quantity of heat in the gas being constant. Hence, as the volume increases, not only the pressure but also the temperature decreases. Accordingly these lines cut successive equal temperature lines, which represent the variation of pressure with

volume, supposing the temperature constant. These curves are of immense service in treating of Thermodynamics (q. v.)

Adiantum, a genus of ferns. See MAIDENHAIR.

Adigé, a river of N. Italy, rises in the Rhetian Alps, flows E. into the Tyrol, then turns to the S., passing Trent, Roveredo, and Verona, and enters the Adriatic about 5 miles below Chioggia. Next to the Po, it is the largest river in Italy, having a course of about 250 miles. It is a means of transit for the trade between Germany and Italy; nearly 200 flour and rice mills are driven by it; but it is subject to overflowings. Near the A. the Austrians gained a triple victory over the French in March and April 1799.

Adipoceré. This is a fatty substance formed under certain conditions in the dead body when exposed to the action of water or a damp soil. It is an unctuous soapy substance, varying in colour from a pale white to yellow or brown. It melts at 202° F., and burns like spermaceti, but with an ammoniacal odour. It is essentially a kind of soap produced by the union of the fatty acids of the fat of the body with ammonia. Many specimens might be termed oleate or stearate of ammonia. It is supposed that during decomposition ammonia is formed from the breaking up of the muscular structures. This unites with the fatty acid of the fat to form A. After being converted into A., the body may retain this condition for many years. Bodies immersed in hard water containing lime, or buried in graveyards traversed by water which has percolated through chalk, produce a harder kind of A., which consists of oleate or stearate of lime.

Adjective is the name given to that part of speech which adds to the meaning of a noun, by the mention of some circumstance or quality that renders our knowledge more definite. In doing this the A. necessarily narrows the range of the noun. For example, the term 'rose' is applicable to all kinds of roses, but 'red rose' denotes only one kind. The image presented to the mind is more distinct, but all other classes of possible images—such as white roses—are wholly excluded. It is not true that A. always qualifies a noun. It may only express an accidental circumstance or peculiarity. Thus in the phrase 'three men', *three* obviously does not express any quality or property inherent in men, as *red* does in the phrase 'red rose.' We render the term 'men' less vague in point of number by the introduction of an external and separable accident. Adjectives are classified according to their characteristics into those of *quality*, *quantity* (in which may be included 'number' and distribution), and pronominal adjectives. In modern English the A. is infected only for comparison.

Adjudication is a term in the law of England and in the law of Scotland; but the meaning in the former differs from that in the latter. In English law, A. is the fiat of court by which a debtor is adjudged bankrupt, and his estate and effects made the property of his creditors. The A. proceeds upon a petition to the court by a creditor, or more than one, setting forth that the debtor has committed an Act of Bankruptcy (q. v.) See also BANKRUPTCY.

In Scotch law there are various kinds of A. *Adjudication for Debt* is a process by which a creditor attaches the land or other heritable estate of his debtor. The process applies to heritable estate (see HERITABLE and MOVABLE) in its widest signification.

Adjudication contra Hereditatem Facientem. When the debtor's apparent heir renounces this succession, the creditor obtains a decree *cognitionis causa*. This A. carries right to the rents due prior to the date of the decree, and is redeemable within seven years by any coadjudging creditor, either of the deceased debtor or of the heir who has renounced.

Adjudication in Security is the form to be followed when the claim is contingent or latent. The debtor must be *vergens ad inopiam*, or other creditors must be adjudging.

Adjudication in Implement is a form for completing a defective title.

Adjudication on Trust Bond is a mode of making up titles to heritage where an heir is apprehensive about incurring representation of his predecessor.

Adjudication on Trust Disposition is a similar legal choice.

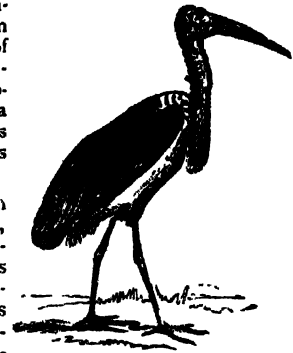
Adjudication Declaratory is a form of action appropriately classed with adjudications.

Adjustment, in the law of insurance, is the fixing the amount of indemnity which the insurer is entitled to under his policy, and the adjusting of the loss among the underwriters. In complicated or disputed cases a professional referee is usually chosen.

The A. is not legally binding, but it is held to transfer the *onus probandi* from the insurer to the underwriter.

Adjutant (Lat. *adjuvare*, to help) is the title of the officer who assists the commander of a regiment or fort. He keeps the books of the regiment, promulgates orders, inspects generally, and notes all infraction of discipline. The *Adjutant-General* assists the general of an army. The *Adjutant-General of the Forces* is an important officer of the Horse Guards.

Adjutant, the English name for *Leptoptilos Argala*, a large Indian bird allied to the stork. The natives call it *argala*. It is of great use in removing noxious animals and carrion, on which it feeds. Its capacity of swallowing is remarkable, making but one mouthful of any substance agreeable to its fancy a foot square. Marabou feathers are obtained from its wings, as well as from a Senegal species.



Adjutant.

Adjygu'rh, a town of British India, Presidency of Bengal, about 100 miles S.W. of Allahabad. It is notable only for its fortress, which occupies an isolated granite hill, and contains within it the ruins of richly-sculptured temples, whose architecture resembles that of the Deccan and the Carnatic. Pop. 5000.

Ad Libitum (in Ital. *a piacere*), an expression sometimes met with on the titlepage of musical compositions with reference to their execution by different instruments. For instance, a Sonata for the piano, with horn and flute or violoncello *ad lib.*; it being left to the performer to choose one of the three instruments for accompaniment. It means also that the solo singer or player may introduce a spontaneous ornament or leave it out.

Administration and **Administrator**. In England, when any one dies intestate or without appointing an executor, or when an executor declines to act, the ordinary or bishop of his diocese appoints some one to 'administer'—that is, to collect and distribute his property. The personal property of the deceased vests in the A. from the date of grant of letters of A. In ancient times the right to administer fell to the crown; but by Magna Charta it was given to friends and relatives, under direction of the Church. Under ecclesiastical guidance, however, beneficiaries found that what seemed to them an undue share was applied to 'pious uses.' This view led to the passing of an Act under Edward III., by which the right to A. was given 'to nearest and most lawful friends.' See EXECUTOR.

Administration, in politics, is usually used in England to denote the sovereign's Cabinet or Ministry (q. v.). In its larger sense it denotes the whole executive machinery of a state.

Administration of Charities is chiefly regulated by 16 and 17 Vict. c. 137, giving powers to the crown to appoint officers for the purpose. The relative claims of the English and Roman Catholic Churches are equitably provided for. Charities more or less depending on voluntary contribution are exempt from the operation of the Act.

Administrator-in-Law is, in Scotch law, the office of Tutor or Curator (q. v.) for one in Pupillage or Minority (q. v.); belongs to the father, who has jurisdiction over all property bequeathed to the child, unless otherwise provided by the bequest. It ceases if the child discontinues to live with the father, unless he continues to live at his expense. It ceases on the marriage of a daughter.

Admiral, the title of the highest rank of naval officers. The word probably comes from the Arabic *Emir* or *Amir*, 'lord,' and was originally written in English 'Amiral' or 'Admiral' (e.g., *Paradise Lost*, B. i. l. 293, 294), 'To be the mast of some great admiral'. It is so preserved in French. The first English 'Admiral of the Seas' mentioned is William de Leybourne, 1286. The title under which the powers of this office were subsequently held was Lord High Admiral of England. The last Lord High Admiral was the Duke of Clarence, afterwards William IV. The administrative functions which belonged to the office are now vested in the *Lords Commissioners of the Admiralty*; and the judi-

cial authority which belonged to it is exercised by the *High Court of Admiralty*. In the British navy there are three classes of admirals—Admirals, Vice-Admirals, and Rear-Admirals. The admiral carries his colours at the main, the vice-admiral at the fore, and the rear-admiral at the mizzen mast-head. *Admiral of the Fleet* is a higher rank conferred at the will of the sovereign.

Admiralty Court. The jurisdiction of this court now embraces all questions relating to war prizes and piracy. Abroad, the Vice-Admiralty courts have jurisdiction in the latter questions. While the office of Lord High Admiral existed, the judge in this court derived his authority from him, but he now holds it directly from the crown. The decisions of the Admiralty courts at home and abroad are now subject to appeal to the Judicial Committee of the Privy Council. The jurisdiction of the Vice-Admiralty courts in the foreign dominions of the Queen has been extended and defined, and their procedure regulated by statute. The civil jurisdiction of the courts embraces all questions of maritime rights and contracts, such as arise between shareholders of ships, or regarding wages, pilotage, bottomry, and respondentia bonds, salvages, wrecks, collisions, &c. By the statute, the judge in the A. C. is, in virtue of his office, also a judge of the Central Criminal Court, and that court is empowered to try criminal offences which would formerly have come under the jurisdiction of the A. C. There is a separate A. C. in Ireland. In Scotland it has been abolished, and its ordinary jurisdiction transferred to the Court of Session, the Court of Justiciary, and the sheriffs. Jurisdiction in questions regarding prizes and condemnations, however, belongs exclusively to the High Court of Admiralty in England.

Admiralty Droits once formed part of the revenues of the Lord High Admiral, or, when his office was vacant, of the crown. They were obtained from the seizure of enemies' ships lying in port at the declaration of hostilities, or coming into port in ignorance of hostilities having been declared, from the capture of piratical cruisers, or from the proceeds of wrecks. All such moneys or chattels obtained in this way are now paid into the public exchequer.

Admiralty Island, on the N. American coast, belongs to United States, lies about 58° 24' N. lat., and 135° 30' W. long. It is about 80 miles long and 20 wide, and is clad with pine forests.

Admiralty Islands, about forty in number, lie in the Pacific, N.E. of New Guinea, between lat. 2° and 3° S., and long. 146° 18' and 147° 46' E. The centre isle of the group, surrounded by a cordon of reefs, is about 50 miles long. Some of the islands are covered with cocoa-nut trees, and are inhabited by a race of the negro type.

Adonis, the Graecised form of the Phœnician word *Adon*, 'lord,' is the name of a beautiful youth beloved by Aphrodite. Being mortally wounded by a wild boar, Aphrodite sprinkled nectar into his blood, whence flowers immediately sprang up. On his descent to the infernal world, Persephone also became enamoured of him; but commiserating Aphrodite, she allowed A. to spend six months every year with her in the upper world. The myth of A. was introduced into Greece from Syria, and inwoven with the Greek mythology. Originally, perhaps, it was nothing more than an emblem of the death of nature in winter and of its revival in spring, an idea strengthened by the fact that the name Adon was applied by the Phœnicians to the sun.

Adonis, a small genus of plants belonging to the order *Ranunculacea*. One species (*A. autumnalis*) is naturalised in Britain, and called Pheasant's Eye. It has also received the name of *Flos Adonis*, from its bright scarlet-coloured petals having poetically suggested the notion of their being stained with the blood of Adonis. *A. vernalis* and *A. aestivalis*, natives of Central Europe, are commonly cultivated in gardens.

Adoption Controversy. The, arose in Spain towards the close of the 8th c. Elipandus, Archbishop of Toledo, and Felix, Bishop of Urgel, maintained that though, in respect of his *divine* nature, Christ might be called the Son of God, yet in his *human* nature he could only be supposed to be such by adoption. From Spain the controversy was carried into the Frankish empire, and the new opinions were condemned as heretical, first by the Synod

of Ratisbon in 792, and again by the Synod of Frankfurt in 794, at which Charlemagne himself was present. Felix retracted his views at the Synod of Aix-la-Chapelle in 799, but Elipandus adhered to them with courage or obstinacy, and in later times they have been maintained by various distinguished men, as Duns Scotus, the schoolman (14th c.); Basquiz, the Jesuit (17th c.); and the Protestant theologian Calixtus (17th c.).

Adoption, in Roman law, was a term properly applicable to the act by which, in the case of a child, the *patria potestas* was transferred from the real parent to the person who adopted it. The child took the name of its adoptive father, and came under an obligation to perform all the religious rites and observances incumbent on the members of the family into which it had passed. When the person adopted was old enough to be his own master, the act was called *adrogatio*, and sometimes it was resorted to for political ends. Thus a public man would get himself transferred from a patrician to a plebeian family that he might be eligible for some office. A. was only possible where the adoptive father had no children of his own. The practice was also followed in Greece, but was not known among the Teutonic nations, and it is a part of the Roman law which has not established itself in modern communities. In England or Scotland a child may be adopted, *i.e.*, received into the house of one who is not its real parent, and may receive the name of such person, but no filial duties are imposed by law, and no legal position in the family is secured to such a child by the act of its adoptive father.

Adour, a river of France, nearly 200 miles long, rises in the department of the Upper Pyrenees; forms a fall 100 feet high in the beautiful valley of Campan; flows through Gers and Landes, entering the Bay of Biscay three miles below Bayonne. It is navigable for about 80 miles.

Adowa, a town of Abyssinia, capital of Tigré, and 145 miles N.E. of Gondar, lies on a tributary of the Atbara. It is the great entrepôt of trade between the N. of Abyssinia and the Red Sea ports, has manufactures of cotton cloths, iron, and beads in and exports by transit gold, ivory, and slaves. Pop. supposes to be about 8000.

Adra (the *Abdera* of the Phœnicians) is a seaport in the of Spain, province of Granada, 49 miles S.E. of Granada. Tally inhabitants are largely employed in the neighbouring lead-mines, but also carry on a considerable export trade in grapes and wheat. Pop. 9000.

Adria, a very old town of N. Italy, in the province of Rovigo, with a population of 10,000, gives name to the Adriatic Sea. Anciently it was a station for the Roman fleet, and a considerable seaport, but owing to the gradual silting up of this part of the Adriatic it now stands 10 miles from the coast.

Adrian, a name borne by six popes. Of these Adrian IV., whose name was Nicolas Breakspere, was the sole Englishman that ever wore the triple crown. He was born near St Albans; entered the abbey of St Rufus, near Avignon, as a lay-brother, and was elected abbot in 1137; was made cardinal-bishop of Albano in 1146 by Eugenius III.; succeeded Anastasius on the papal throne in 1154; died September 1159. The notable thing in his pontificate was the beginning of the papal conflict with the Hohenstaufens of Germany—the fourth crisis of the Guelph and Ghibelline struggle.

Adrianople, the second city of Turkey, stands on the Mariza (anc. Hebrus), in a vilayet of the same name, and is walled and defended by a citadel. Its finest buildings are the immense bazaar of Ali Pasha, and the beautiful mosque of Selim II. A. was the European capital of the Ottoman Turks till the capture of Constantinople in 1453. The war with Russia was terminated here in 1829 by the Treaty of A., which virtually restored to independence the Danubian Principalities, and ceded to Russia the plain of the Kuban, and the right of navigation of the Black Sea, Danube, and Dardanelles, the Danube to be the northern boundary of Turkey. The chief manufactures are silk, cotton, and perfumes; exports, opium, wool, and leather. Pop. (*Almanach de Gotha*, 1875) from 100,000 to 150,000.

Adriatic Sea, a name applied to that arm of the Mediterranean that stretches from S.E. to N.W., between Italy on the

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After becoming a river, it is connected with the Ionian Sea. In the N. lies the N.E. the Gulf of Trieste, and to the S. of the Gulf of Fiume or Quarnero. Except the rivers running into it are mere moun-

as the 16 (mod. Zulla), on the W. coast of the Red Sea. Here Cosmos Indicopleustes (q. v.), a merchant of the 6th c., found a Greek inscription, the *Monumentum Adulitanum*, useful for purposes of ancient geography, which he has preserved in his *Topographia Christiana*.

Adultery is the sin of incontinence in a married man or woman. According to the Roman and Mosaic law, a man was not guilty of the offence unless the participant woman was married. Following the ecclesiastical law, however, modern Europe and America generally have held that a man may commit A. with an unmarried woman, thus placing husband and wife on the same footing. During the Commonwealth in England, the offence was made a capital crime. It is now only held by the law to be a civil injury, the remedy being provided by the Divorce Acts of the present reign. The adulterer is made co-respondent in the suit, and may be found liable for costs and damages. The extent of the latter will be affected by the social position of the plaintiff, means of the defendant, and circumstances of the case. By the old law of Scotland, certain flagrant forms of A. were held a capital crime. But the statute (1563) so constituting it has long since fallen into desuetude; and in Scotland now, as in England, the offence is not held to be a crime; but it constitutes a ground of action of divorce, and of a civil action for damages. See DIVORCE, SEPARATION.

Advent (Lat. *adventus*, the 'coming' or 'approach'), in ecclesiastical usage, denotes a certain period before Christmas. In the Greek Church it lasts forty days; in that portion of the Latin Church which still observes it, viz., the Roman, Anglican, and to some extent the Lutheran communions, it lasts four weeks. A. is first mentioned as a festival enjoined by the Church at the Synod of Lerida, 524 A.D., which forbade marriages to be celebrated during its continuance. The explanation of the four weeks is to be sought in the old theological view of the fourfold coming of Christ, viz., his coming in the flesh, his coming at death to receive the spirits of the faithful; his coming at the fall of Jerusalem; and his coming at the judgment-day; and the 'gospels' for the four Sundays were chosen in harmony with this. As the beginning of the ecclesiastical year, and the season that ushers in the holy day of the Nativity, it has always been regarded as an appropriate time for solemn and penitent thought. ('Repent, for the kingdom of heaven is at hand.') Hence the prohibition of worldly amusements and festivities in the Roman Catholic Church. This view of A. was finally sanctioned by Urban V. in 1370.

Adverb. This part of speech receives its name because it is most frequently joined to the verb, which it limits in some way that an adjective does a noun. It can, however, be also joined to an adjective or another A. Like the adjective, it admits of comparison only where gradation is possible. As we can have the adjectival forms bright, brighter, brightest, so we can have the adverbial forms brightly, brighter, brightest, but degree is alike inconceivable in the adjective 'round,' and the A. 'here.' Adverbs are classified by grammarians under the heads: of time, place, degree, manner, cause, &c.

Advertisement (Fr. *avertissement*), a notice to the public, usually given in the newspapers and other periodicals. An A. has often an important legal effect; thus the advertising of a ship for a particular voyage places the master on the footing of a public carrier, entitling the merchant to have his goods shipped, so long as sufficient freightage is disengaged. See CARRIER-PARTY, CARRIER. A. is frequently required as a qualification for statutory privilege, as under Road and Bridge Acts, &c. In the *Gazettes* of London and Edinburgh it is frequently required by law, as in dissolution of partnership, under the Bankrupt Acts, &c. See NEWSPAPER.

Advocate (Lat. *advocatus*), one called in, inferentially, to plead for another. In Scotland, the profession of an A. corresponds to that of a barrister in England. See ADVOCATES, FACULTY OF. In ancient Rome, the office of the A., or bar-

ister, was, as with us, quite distinct from that of the attorney or agent, who represented his client in the litigation and furnished the A. with information regarding the case. The division of these occupations does not everywhere prevail. They are united in many of the states of Germany, in Geneva, in America, and in some of our colonies.

In France the *avocat* and *avoué* correspond pretty nearly to the barrister and attorney in England. The French A. possesses the same privileges as to irresponsibility for his advice, and for the statements of his instructions, as belong to members of the corresponding branches of the legal profession in this country. Like the English barrister, he has no legal claim for his fees. It is etiquette at the French bar that in communicating articles of process to each other no acknowledgment shall be given; and it is asserted that during the many centuries this rule has existed, it has never once been ignored.

In Belgium, Geneva, and those German states by which the Code Napoleon has been received, the organisation and discipline of this branch of the legal profession are similar to the French.

Advocate, Lord. This is the title of an important legal and political officer in the management of Scotch affairs. He is necessarily a member of the Faculty of Advocates; and, according to custom, he is selected from the most eminent counsel belonging to the political party in power. He is *ex officio* one of the Queen's ministers, but he is not usually a member of the cabinet. The L. A. is assisted in his duties as public prosecutor by the solicitor-general, and four junior advocates called advocates-depute. The parliamentary duties of the office are very onerous, involving the preparation and introduction of all government measures which are especially Scotch. An excellent historical account of the office will be found in a judgment of the late Lord Medwyn, in 'King's A. against Lord Douglas,' 24th December 1836. The title was originally King's A.; one of the fifteen original judges of the Court of Session being so named between 1525 and 1538. The first mention of a Lord A. is in the record of the Court of Justiciary in 1598. In 1582 the salary of the office was £40 Scots. It is now £2387, with considerable emoluments from patents and other sources. The official duties of the L. A. do not prevent him from continuing his ordinary practice. Though not necessarily a privy councillor, he is by courtesy addressed as 'The Right Honourable' during his tenure of office.

Advocates, Faculty of, in Scotland. The constitution of this body is derived from that of the French *avocats*. The profession of advocate is a very old one in Scotland. In 1424 we find a statute for securing the assistance of an advocate to the poor: 'And gif there bee onie pure creature,' says the Act, 'for fault of cunning or dispenses that cannot or may not follow his cause, the king, for the love of God, sall ordain the judge before quhom the cause sulde be determined to pursue, and get a leill and wise advocate to follow sik pure creatures causes.' This regulation has remained in force with but little alteration to the present time. See POOR'S ROIL. The profession, however, was not constituted a Faculty till the institution of the College of Justice (q. v.) in 1532. The number of members was originally limited to ten, but it is now unlimited. All candidates for admission require to pass an examination in law. An examination must also be passed in general scholarship, unless the candidate is a Master of Arts in a British university, or has so graduated in a foreign university, as to satisfy the Dean of Faculty and his council that such scholarship has been attained, as is denoted by the British degree of M.A. The scholarship examination is on the following subjects: Latin; Greek, or, at the candidate's option, any two of the following languages--French, German, Italian, or Spanish; Ethical or Metaphysical Philosophy; Logic, or at the candidate's option, Mathematics. The candidate being found qualified, may, after one year, go in for the law examination. He must not, however, in the meanwhile, have been engaged in any trade or profession either on his own account or as assistant. Proof of attendance at the law-classes of Edinburgh University is requisite. An advocate may plead before all the law courts of Scotland, civil and ecclesiastical, as also before the House of Lords. There is a widows' fund belonging to this body, which is regulated by statute. The supreme judges of Scotland and the sheriffs of the counties are always chosen from the Scotch bar; so also are generally the sheriffs-substitute. The fees of admission to the Faculty of A. are about £340.

Advocates' Library, the library belonging to the Faculty of Advocates, Edinburgh, instituted 1682 by Sir George Mackenzie. It ranks as the fourth British library, and is by far the largest in Scotland, containing (1875) 250,000 volumes. It is specially rich in Scottish history, law, and scholastic theology; but modern foreign literature is not adequately represented. The complete character of its collection of English literature is due to its receiving a copy of every new book published in the kingdom, a privilege granted by the copyright law of 1709, and continued down to the present day.

Advocation, the process was so called in Scotland by which a cause was moved from an inferior to the superior court, either that it might go on there or that a judgment might be reviewed. The process was abolished in 1868; and an appellant from a sheriff-court judgment does not now, as formerly, require to find security for expenses. An appeal is open for twenty days after date of final judgment, and it is competent for six months after the twenty days, unless it has been extracted or implemented in the meantime.

Advocatus Diaboli ('Devil's Advocate') is the name given in the Roman Catholic Church to the individual whose business it is when any deceased person is proposed for canonisation, to urge all possible objections to the proposal. His opponent who favours the canonisation is called *Advocatus Dei* ('God's Advocate').

Advowson, the right of presenting to a benefice. The person who presents is the *patron*, the presentee is the *clerk*, and the bishop of the diocese is the *ordinary*. An A. is either *appendant* or *in gross*. An A. appendant, having been immemorially annexed to a manor, is conveyed by any deed that transfers the manor itself. An A. once detached from a manor becomes annexed to the person of its owner, and is then an A. *in gross*. When the bishop and patron are one he *collates* a clerk, and the A. is *collative*. A *donative* A. is when the patron can appoint to the benefice without the approbation of the ordinary, the right of visitation being vested in himself.

Ædiles, originally so called from their having the care of the temple (*ædes*) of Ceres, though their supervision subsequently extended to all public buildings and places. At first there were two plebeian Æ., their institution dating from B.C. 494. Two curule Æ. were selected from the patricians, 365 B.C., and in B.C. 45 Julius Cæsar added other two plebeian Æ., the number being then six.

Æga, a genus of *Isopodous crustacea*. They are generally termed fish-lice, being parasitic on the bodies of fish. They are found in all parts of the world. The fishermen of Newfoundland call them 'fish-doctors.'

Ægilops, a genus of grasses allied to wheat-grass, or *Triticum*. *Æ. ovata* is supposed to be the plant from which has originated our cereal wheats.

Ægina, an island in the Gulf of Egina, area 41 square miles. The western part is level and fertile, but the rest is hilly and barren. Rocks and shallows render it difficult of access, and it possesses only a single haven. Of the ancient Æ. (now Egina) numerous remains are still extant. The islanders, who number 7000, are remarkable for their industry. Corn, wine, oil, and fruits are the principal products.

Æginetan Sculptures. Ægina was anciently celebrated as a school of art, and the names of many of its sculptors were famous. In 1811 a party of English and German art-students excavated the sculptures which had occupied the tympana of the temple of Jupiter Panhellenius, or, as some believe, of Pallas. They were purchased for the Royal Gallery of Munich. Casts of them are now in the British Museum. Though not of the best age of Æginetan art, they are natural, graceful, and well proportioned.

Ægis (a goat-skin), the shield of Zeus, who is hence styled ægis-bearing. This shield exhibited the head of the Gorgon. The Æ. was also an attribute of Athena, and symbolised the divine protection.

Æglé, a genus of plants belonging to the order *Aurantiacæ*, or Orange family. *Æ. Marmelos* yields the Bhel or Bael-fruit of India, which resembles a large orange. The rind of the unripe fruit is strongly astringent, and is used in

cases of dysentery in India. The present. Felix retracted his assent, and a yellow dye is obtained in 799, but Elipandus

Ægophony is a term employed in music, and in later times peculiar sound, similar to the bleating of a goat, distinguished men, as ear is applied to the back of the chest, over the base of the Jesuit (17th in cases of pleurisy in which a large amount of fluid effused into the pleural cavity. It is produced by the sound, to the voice being modified by passing through a layer of fluid.

Ægopodium Podagraria, an umbelliferous plant, which is a great pest in many gardens. It is known as herb Gerard, ash-weed, English master-wort, cow-cabbage, and goat-weed. It was formerly used as a specific for gout, hence its specific name. The A. is indigenous to Britain.

Ægospotami (the Goat-River), in the Thracian Chersonesus, where Lysander defeated the Athenian fleet, B.C. 405. This defeat virtually brought the Peloponnesian war to a close.

Ælfric, an English ecclesiastic of the 10th or 11th c., whose history is more obscure than his fame. He is said to have been of noble birth, but the evidences are not satisfactory. From a simple 'monk and mass priest,' as he calls himself in the preface to his *Homilies*, he rose to be Archbishop of York or Canterbury. The date of his death is uncertain. A. had the true English love of the mother tongue which marked our countrymen before they came under the foreign rule of the Latinised Normans, and a good deal of his scholarship and literary activity was bestowed on the vernacular. Of his good sense and clear Christian doctrine we have abundant evidence in his writings, some of which were popular long after the Conquest, and reappeared in the corrupt English of the time. Those usually ascribed to A. are two volumes of homilies, canons or injunctions to the clergy, a translation of the younger Priscian, with a glossary, and a translation of various parts of the Old Testament.

Ælianus Claudius, who lived probably about the middle of the 3d c. A.C., was born at Palestina. He was a citizen of Rome, where he taught rhetoric. He acquired such a mastery of Greek that he spoke and wrote it with ease and elegance. His two principal works are his *Varia Historia*, or *Miscellaneous History*, a fourteen books, a compilation valuable for its numerous extracts from authors whose works have been lost; and a gossiping treatise, in seventeen books, *De Animalium Natura*, or, *On the Peculiarities of Animals*. Of the former there is an edition by Kühn, Leipz. 1780, 2 vols. 8vo; and of the latter one by Fr. Jacobs, Jena, 1832, 2 vols. 8vo.

Æmilius Paulus, subsequently surnamed **Macedonicus**, son of the consul Lucius Æmilius Paulus, who fell at Cannæ, was born about 230 B.C. Though inheriting the patrician prejudices of his family, and too proud to flatter the people for office, his unquestioned integrity in the midst of manifold temptations secured for him unbroken respect and confidence. After having rendered the state valuable services, both as a civilian and as a soldier, he was, when fully sixty years of age, pressed to conduct the war against Perseus, King of Macedonia. Elected consul for a second time, B.C. 168, he arrived in Macedonia in June of that year, and by the defeat of Perseus at Pydna terminated the war, and put an end to the Macedonian kingdom. He sent immense booty to Rome, where in November 167 B.C. he celebrated his triumph with extraordinary magnificence. But family misfortune dimmed his glory, for of his two younger sons one died five days before, and the other three days after, his triumph—calamities which he bore with touching equanimity. He died B.C. 160.

Æneas, the son of Anchises and Aphrodite, after Hector the great bulwark of the Trojans in their contest with the Greeks. On one occasion he led the fourth division of the Trojans, and on another engaged in combat with Achilles, from whom he was rescued by Poseidon. Such is the Homeric story. After the fall of Troy, according to later stories, he collected the people at Mount Ida, but being threatened by the Greeks, he left the coasts of Asia, and crossed over into Europe, and finally settled in Latium. He is the hero of Virgil's epic, the *Æneid*, in which, to connect him with the Julian family, he is, after many wanderings, conducted to Latium. Latinus, King of the Aborigines, prepared for war, but afterwards concluded an alliance with Æ., and gave him his daughter Lavinia in marriage. A. founded a town, which he named Lavinium, after his wife

After becoming sole ruler of the Aborigines and Trojans, he is said to have fallen in a battle with the Rutilians. The account of his wanderings given in the *Æneid* is substantially the same as that of Dionysius of Halicarnassus, Virgil's contemporary, and neither has any historic value.

Æolian Harp, a musical instrument producing harmonic sounds by the action of the wind on strings of catgut or wire, tuned in unison, and stretched over a box of thin deal. The inventor is said to have been the German Jesuit, Athanasius Kerches (1602-80); but it first became well known through Pope and the Scotch musician Oswald in last century.

Æolians, one of the most powerful of the Hellenic people. Originally settled in Thessaly and Boeotia, at an early period they spread themselves over the N. of Greece and the W. of Peloponnesus. Still later they sent numerous colonies to Asia Minor and to Lesbos. The Lesbian colonists established a variety of the Æolic dialect, carried to perfection in the lyrics of Alcæus and Sappho.

Æon (comp. Lat. *æum*, Eng. *ever*, Ger. *ewig*), a Greek word strictly denoting an age, but also applied to eternity. The Æons of the Gnostics were certain emanations of the divine nature, and were so called either because as powers they were placed over the different ages of the world, or because they partook of the eternal duration of God.

Ærate Bread. The vesiculation or raising of bread in baking is accomplished in two distinct ways. By the ordinary, or fermentation, process (see **BREAD**) carbonic acid gas is generated in the dough by induced alcoholic fermentation, but when the carbonic acid is developed from a foreign substance, such as an alkaline carbonate, or introduced from without, aerated or unfermented bread is the result. The principal method of manufacturing A. B. is by a process patented by the late Dr. Dauglish. It consists in making dough with water charged with carbonic acid under high pressure, which, by its expansion removal from the closed mixing vessel, renders the mass finely spongy throughout. The water for mixing is charged with carbonic acid in the same manner plain Aerated Water is prepared (q. v.), and the mixing is accomplished in a strong cast-iron cylinder, in which a series of arms revolve by steam-power. The whole process of mixing a sack of flour into dough can be finished in less than half an hour. The dough is expelled from the lower end of the cylinder into a box which is gauged to hold a two-pound loaf, and from the box it is removed into pans for firing without any portion of the material ever being handled. The advantages claimed for A. B. are—1, rapidity and certainty of manufacture; 2, cleanliness of processes; 3, economy, resulting from the fact that there is no waste of flour in mixing nor any degradation of material as in fermentation; and 4, the practicability of making good bread from flour which, by the common process, requires the addition of alum. The absence of flavour in A. B. is one of the chief bars to its more extensive use.

Ærated Waters are effervescent beverages prepared by the solution of carbonic acid gas in water, to which small quantities of saline substances or fruit syrups are frequently added. The simplest form of ærated water is seen in the preparation of 'seidlitz powders,' which are made by dissolving separate portions of tartaric acid and bicarbonate of soda in water. A chemical reaction takes place in which the tartaric acid combines with the soda to form tartrate of soda, liberating the carbonic acid, and the solution is drunk while the carbonic acid is bubbling up through the water. The so-called effervescent citrate of magnesia is essentially the same as seidlitz powder in its character and action. The free use of water so ærated introduces within the system tartrate of soda, or other alkaline salts, in proportions which have a deleterious influence. Such an objection is obviated by the ordinary methods of manufacturing ærated water, which depend for their operation on the fact that water absorbs its own volume of carbonic acid at ordinary temperature. Increase of pressure consequently increases the absorption of the gas, but on removing the pressure, as in the case of soda-water bottle, all the gas beyond what is retained by ordinary atmospheric pressure escapes. Plain ærated water is the basis of all the numerous effervescent waters, and is prepared by two principal methods. In the first case, carbonic acid is evolved from chalk or whiting by the action of either

sulphuric acid or hydrochloric acid in a generator, and washed by passing through water. It then enters a receiver, or strong vessel, in which is placed the water intended to be aerated, and by its own accumulated pressure the gas sufficiently saturates the water. An example of this method, on the small scale, is seen in the 'gazogene,' an apparatus used in houses and small establishments. In the second system, which is that usually adopted by manufacturers, the gas is generated as above stated, but after washing it is stored in a gas-holder. From this it is drawn into the receiver by an air-pump, where it meets and saturates the water; the admission of both being regulated by means of cocks, so that any desired pressure may be maintained. The bottling and corking are performed at an apparatus which has to be guarded specially to prevent accidents by the bursting of bottles. Soda, potash, lithia, and other waters, are prepared by placing measured quantities of solutions of these salts in the bottles before drawing off the aerated water; and similarly, lemonade and other fruit flavours are placed in the bottles and the plain aerated water added to them. Nothing but the aerated water passes through the machines, and the pressure of gas varies only for the different class of beverages. The variety of recipes for lemonade, seltzer, potash, and soda waters, &c., is infinite, each manufacturer suiting his own and his customers' tastes. It is of great importance that the water used should be pure, and that no lead should be employed in any part of the apparatus beyond the point where the gas is washed, as water charged with carbonic acid acts powerfully on lead, and a large admixture of that metal has been detected in samples of A. W., to which cases of lead-poisoning have been traced.

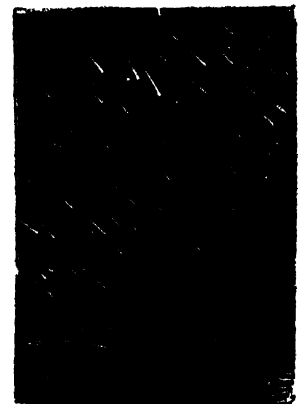
Ærodynamics is the science which treats of the motion of air and other gases, investigating the laws of the passage of air through an orifice or through a tube; the force, nature, and effects of wind, &c., and also the resistance of the air to a body moving through it. For moderate velocities the law that the resistance varies directly as the square of the velocity is sufficiently true for practical purposes; but when the velocity becomes considerable, there is another cause which must be taken account of, viz., the great condensation of the air particles in front of, and the partial vacuum formed behind, the moving body.

Ærolites (Gr. *aer*, air, and *lithos*, stone) are stony or metallic masses which from time to time are precipitated upon the earth. There are different names given to A., according as they appear with or without explosion, at daytime, or at night. Meteors and fireballs (or *bolides*) are explosive, the former appearing during the day, and the latter at night. It is probable, however, that the dark cloud accompanying the explosion during the day would be luminous at night. Shooting-stars do not explode, but A. similar to shooting-stars have been observed to be projected from fireballs. Such facts seem to tend to the conclusion that these are similar in all but outward circumstances.

Until the beginning of this century, the numerous records of the falling of stones from the sky were not generally believed by scientific men; and it was only when M. Biot's inquiry into, and report of, the extraordinary meteoric shower at L'Aigle, in Normandy, in the year 1803, was given to the world, that all doubts of the phenomenon were dispelled.

Among the ancients meteoric stones were regarded as mysterious visitants from the gods, and were consequently worshipped with great veneration. As examples of such we may mention the holy Kaaba of Mecca, and the black conical stone at Emesa in Syria.

A most interesting fact connected with shooting-stars is their periodic appearances. They usually appear singly, and may be observed almost every night; but at certain times they appear



Ærolites.

in great number, radiating from a fixed point in the heavens; and these appearances take place annually. This periodicity affords a strong argument in favour of the theory that they are planetary bodies revolving round the sun in an orbit intersecting that of the earth, and especially as they radiate from that point in the heavens towards which the earth is travelling at that time. The great American shower of November 12th and 13th, 1833, first drew the attention of astronomers to this fact. Exactly a year later another great shower was observed, and now these phenomena are yearly expected. It would also appear that the intensity of the shower varies from year to year, reaching a maximum every thirty-four years. Another great periodic swarm occurs from the 9th to the 14th of August, the magnitude and brilliancy of which reach a maximum every twenty-two years. The August display has also been connected with the appearances of Beila's Comet (q. v.).

A. are to a great extent composed of metals, iron especially being present in great abundance, and resemble very much our own plutonic or volcanic rocks. It was upon this resemblance that the now exploded hypothesis of their being projected from lunar volcanoes was advanced. The specific gravity varies from two to eight times that of water; but Reichenbach remarks that their *mean* specific gravity is rigorously that of the earth; and, reasoning from this, he suggests that the earth and other planets are merely a combination of A., which may be thus an intermediate step between asteroids and comets, which, he urges, differ from the other bodies in the solar system only in their much less density.

Aéronautics. See BALLOON.

Aërostatics is the science which treats strictly of the equilibrium and pressure of air, and the methods for measuring such; but it now embraces similar properties of all other gaseous portions of matter. For information concerning air in particular, see ATMOSPHERE.

According to Boyle's or Mariotte's law, the pressure, or expansive force, of a gas at constant temperature varies inversely as the volume, or directly as the density, of the same gas. Gay-Lussac's law is an extension of this, and states that the absolute temperature (see HEAT) of a gas varies directly as the product of its pressure and volume. These laws are, however, only approximately true for known gases. The ideal gas which obeys these laws is called a *perfect gas*.

Aërostatic Press is a machine for extracting the colouring matter from dye-woods, and similar substances, by means of the pressure of the atmosphere, which forces the extracting liquid through the substance, below which a vacuum has been formed.

Æschines, an Athenian orator, was born 389 B.C. Demosthenes accused him of accepting bribes from Philip, King of Macedon, who had planned the conquest of Greece, to advise the Athenians to conclude a peace with him. Æ., who believed that this policy alone could avert ruin from his country, headed the peace party, while Demosthenes roused his countrymen to a final but unavailing struggle at Chæroneia 338. A crown having been proposed to Demosthenes for his lofty and stainless patriotism, Æ. accused Ctesiphon, the proposer, of illegality, but being defeated, withdrew to Asia Minor, and finally established a school of eloquence at Rhodes, which afterwards acquired celebrity. He died 314 B.C. Of the three orations published by Æ., against Timarchus, on the Embassy, and against Ctesiphon, the best edition is that of Bekker, vol. iii. of his *Oratores Attici*, Oxford, 1822, 8vo.

Æschylus, the father of Greek tragedy, born at Eleusis 525 B.C., died at Gela, in Sicily, 456 B.C. He fought at Marathon 490 B.C., and ten years later in the great naval engagement at Salamis. Of the seventy dramas which he is said to have written, only seven are extant—the *Persians*, the *Seven against Thebes*, the *Suppliants*, the *Prometheus*, the *Agamemnon*, the *Choephora*, and the *Eumenides*. The energy and sublimity of his style well become his daring genius, and the lofty characters he portrays. His plots are simple, and the obscurity with which he has been charged is probably owing to the acknowledged corruption of the text. The drama owes to Æ. the formation of dialogue, properly so called, by the introduction of a second actor, and artistic effect was produced by improved scenery, and appropriate masks and dresses. Numerous versions of Æ. have been made in various languages. The Italian version of F.

Bellotti (Milan, 1821) has a high reputation; the French version of Pierron (Paris, 1841) has been crowned by the Academy; the best German version is that of Voss (Heidelb. 1826); and the English version of Professor Blackie is faithful and spirited.

Æsculapius, the god of the healing art, is represented in the Homeric poems merely as a human being, but the common tradition made him the son of Apollo and Coronis. He was instructed in medicine by Cheiron, and was reputed to have succeeded in restoring the dead to life. He was killed with lightning by Zeus, who feared that men might escape death altogether, or because Pluto had complained that the number of the dead was diminishing. At the request of Apollo he was placed among the stars. He was worshipped over the whole of Greece, and had a famous temple and grove at Epidaurus. His statues resembled those of Zeus. One hand held a staff, the other rested on the head of a serpent, while a dog lay by his side. Serpents were always connected with his worship, and he himself often appeared in that form. Those cured of disease sacrificed a cock or a goat to Æ., and hung up votive tablets in his temple. Several of these have been preserved.

Æsculus. See HORSE-CHESTNUT.

Æsir is the common name given to the gods of the Northern mythology. At first we hear of only three, Odin, Vili, and Ve; but afterwards the number was increased to twelve, not counting Odin, viz., Thor, Njord, Frey, Baldr, Tyr, Heimdal, Bragi, Forseti, Ilad, Vidar, Vali, Ullr. Loki, who figures among them (like Satan in the prologue to Job), is rather to be regarded as the Norse Fiend, or Adversary. Along with these rank certain goddesses, of whom Frigga, Freyja, Idun, Eir, Saga, Nanna, and Sif are the best known. The old chroniclers of the 13th c., connected the word A. with Asia, and imagined an emigration from that continent, under the leadership of a chief named Odin, who established himself in Scandinavia, and carried thither the language and culture of the South. But such attempts to give a pseudo-historic reality to Odin have long been abandoned, and it is now believed that the A. is the mythic expression of an old indigenous Teutonic worship. The name appears in all the great Teutonic languages; e.g., Goth, *ans*, pl. *anseis*. Ad High Ger. *ans*, pl. *ansi*; old Norse, *æs*, pl. *æsir*; Sax. *as*, pl. *es*; and it is seen in such names as Asgar, of which the Norse form is Asgeir, Anselm, and the Eng. Oscar, Oswald, Osborne.

Æsop, the fabulist, on the late authority of Diogenes Laertius and Plutarch, is stated to have lived in the 6th c. B.C. No work of his is extant, nor is it probable that he committed any fables to writing. Some have even denied his existence. According to the writers mentioned, he was originally a slave, but subsequently received his freedom, visited Croesus and Pisistratus, and was thrown from a precipice at Delphi in consequence of a dispute with the citizens. Fables, ascribed to Æ., were popular at Athens, and allusions to them are found in Aristophanes. Bentley's theory, that his fables were transmitted by oral tradition, is the only probable one. Both Socrates and Demetrius Phalereus turned some of them into verse. The fables now bearing his name are undoubtedly spurious, and are not found in any MS. older than the 13th c. The different sets of them that are extant were published at Breslau in 1810 by J. G. Schneider.

Æsthetics (Gr. *aisthētikos*, belonging to perception, or sensation; *aisthanomai*, I feel), the name originally applied in Germany by Baumgarten (q. v.) and his followers to the 'science of the Beautiful,' or the philosophy of the fine arts as the highest expression of the beautiful. Baumgarten's view of the science included all sensuous apprehension. He perhaps states his position most clearly when he says, 'We perceive beauty wherever we meet with perfection manifested in reality, and a thing is perfect if it is adequate to its notion; beauty, accordingly, is the perfectness of an object manifested in its appearance.' Kant insisted that beauty is not a property of objects, but has its origin in the disposition of our mental faculties. Schiller regards beauty as originating in the perfect union of matter and spirit, and his wander-theory of the beautiful is that of the absolute idea. The Aborigines, consequently, there is nothing absolutely beautiful in alliance with, although, on the other hand, there is an eternal marriage. Towards this. Poetry reaches more nearly the absolute after his wis-

than the constructive arts, for in poetry the ideal element of *thought* obtains a higher development than in the more material arts of Painting, Architecture, or even Music.

The discussion of the theory of the beautiful, in England, may be said to have begun in the early part of last century. Dr Hutcheson, in his *Enquiry*, argues for the existence of an 'internal sense,' by which we perceive the beautiful. In his *Treatise on the Sublime and Beautiful*, Burke has drifted into confusion as to what is meant by beauty. Next came Alison's once famous *Essays on the Nature and Principles of Taste*, in which the 'association' theory is maintained. His brilliant and clever disciple, Jeffrey, made it very attractive for a time. According to him, our emotions in the contemplation of the beautiful 'are not produced directly by any qualities in the objects which excite them; they are occasioned, not by any inherent virtue in the objects before us, but by the accidents, if we may so express ourselves, by which these may have been enabled to suggest or recal to us our own past sensations or sympathies.' Sir Wm. Hamilton, in his *Lectures on Metaphysics*, maintains that beauty is both absolute and relative. The former is the result of a free exercise of imagination, perception, recognising, say, the absolute beauty of a flower or shell; the latter is attained by an act of the understanding, in which the adaptation of means to an end is seen to be admirable. Among the most lucid British writers on *Æ*. are Dr McVicar (*Philosophy of the Beautiful*, 1855), Mr Ruskin (*Modern Painters*), and Professor Blackie, whose work *On Beauty: Three Discourses delivered in the University of Edinburgh*, 1858, is perhaps the simplest and most satisfactory handbook on the philosophy of the beautiful yet written. In the main points of the discussion these writers agree. Ruskin says, 'There is not one single object in nature that is not capable of conveying' ideas of beauty. The 'internal sense' of the older writers, by which we appreciate beauty, is not, says Blackie, 'a distinct faculty of the mind, but only a function of the imagination, whereby it perceives beautiful forms and sounds, accompanied by a pleasurable emotion.' 'What then,' he asks, 'is the speciality in the case of what, with the Germans, for want of a better epithet, we must call the æsthetical action of intellect? Plainly, the mind in this case has to do with concrete wholes, originally insinuated by means of the inlets of the internal senses, but acted upon and moulded by the imagination (which is a sort of inner and more intellectual sense), so as to receive from it a new, and, in the case of the fine arts generally, a more perfect type; and these types, of well-ordered form and colour, being entertained by the mind, produce an emotion of serene pleasure and complete satisfaction.' In a very clever little work, *The Philosophy of Art*, by Taine (q. v.), Professor of *Æsthetics* in the *École des Beaux Arts*, Paris, the author explains his system of *Æ*. as an 'application of the experimental method to art in the same manner as it is applied in the sciences.' 'The modern (æsthetic) method,' says Taine, 'which I strive to pursue, and which is beginning to be introduced in all moral sciences, consists in considering human productions, and particularly works of art, as facts and productions of which it is essential to mark the characteristics, and seek the causes; and nothing beyond this.' But perhaps M. Taine too easily satisfies himself. The whole philosophy of the subject lies beyond his 'positive' criticism, and is probably to be found in the higher idealism of Hamilton and Blackie.

Æstiva'tion, a term used in botany to denote the mode in which the parts of a flower are folded in the flower-bud before it opens.

Ætius, the last champion and bulwark of the Western Roman Empire, was of Scythian origin, and was born, A.D. 395 or 396, at Dorostana, in Lower Moesia. He entered the imperial army at an early age, and for some years was a hostage among the Goths and Huns, over whom he exercised great influence. In A.D. 424, after the death of Honorius, he brought together 60,000 of them to maintain the claims of the usurper John against the descendants of Theodosius, and on his reconciliation with the latter, he employed them to combat Boniface (q. v.), who had delivered Africa into the hands of the Vandals. Under the regency of Placidia, and the rule of her son Valentinian III., *Æ*. became patrician, and wielded the whole force of the empire. In a series of brilliant campaigns (A.D. 426 and 430) he repelled the assaults of the Visigoths in Southern Gaul, of the Franks on the Lower Rhine (A.D.

428 and 431), of the Burgundians (A.D. 435 and 436), and of the Celts of Armorica (A.D. 436). When he saw the great storm of Hunnic savages about to break over the West, he swiftly formed an alliance with Visigoths, Armoricans, Burgundians, Alans, and Franks—the very tribes with whom he had been warring for nearly twenty years—and by their help scattered the hordes of Attila on the world-famous field of Chalons (A.D. 451). The struggle was renewed on the N.E. border of Italy in 453, and *Æ*., though no longer supported by his Celtic and Teutonic allies, was preparing to obstinately defend the peninsula, when Attila was induced by Pope Leo I. to withdraw his forces. *Æ*. then presented himself at the imperial court, to ask from Valentinian the fulfilment of his promise, viz., the hand of his daughter in marriage. The answer of the jealous voluptuary was the murder on the spot of the hero who had saved the empire (A.D. 454).

Æt'na. See ETNA.

Ætolia, a district of ancient Greece, bounded on the W. by Acarnania, E. by Locris, N. by Thessaly and Epirus, and S. by the entrance to the Gulf of Corinth. It had only two plains of any magnitude, the rest of the country being occupied by wooded and craggy mountains, which neither in ancient nor modern times have been crossed by a road. At the time of the Peloponnesian war the Ætolians were wholly uncivilised, but they ultimately became one of the three great powers of Greece. The Ætolian League, the general assembly of which was styled the *Panætolicon*, first became important after the death of Alexander the Great, and was formally dissolved B.C. 167, *Æ*. having some years before been subjugated by Rome. Along with Acarnania (q. v.) it now forms a nomarchy of the Greek kingdom.

Affidavit, an oath in writing, or a written declaration, the truth of which is sworn to or affirmed (see AFFIRMATION) before a person legally authorised to administer an oath. In England, when evidence is laid before a jury, it is given orally; where it is to inform a court or judge it is put in form of an *A*. In Scotland a voluntary *A*. is not generally received as evidence, there being no opportunity to cross-examine the deponent. Under the Scotch Bankrupt Act, however, claims must be lodged with affidavits of verity; and there are similar statutory provisions. The Lord Chancellor of England is empowered to grant commissions for taking affidavits, affirmations, and declarations in Scotland.

Affinity, in law, is the relationship arising from marriage between the husband and his wife's blood-relations, and between the wife and her husband's blood-relations. A husband's relation is held equally related to his wife, and a wife's relation equally related to her husband; but no *A*. is created by marriage between the kinsmen themselves. Thus the husband's brother or sister is not related to his wife's brother or sister, and the connection is no impediment to marriage. The legal effect of *A*. as regards marriage is somewhat obscure. See MAR-RIAGE.

Affinity (chemical) may be defined as the tendency of bodies to unite together. In proportion as this tendency is greater or less, so the *A*. of the substances in question is said to be powerful or weak. The more powerful the *A*. of two bodies, so much the greater is the difficulty experienced in disuniting them, when combined. The stability of a compound (or its power of resisting decomposition) is a measure of the *A*. of its components for one another. Hydrogen has a strong *A*. for chlorine; the two elements readily combining to form a very stable compound called hydrochloric acid (HCl). Hydrogen and iodine, on the other hand, have a very slight *A*. for one another. They do not combine *directly* under ordinary conditions; nevertheless a compound called hydriodic acid (HI) is easily obtained by indirect means, and this compound is in many respects very analogous to hydrochloric acid. It is so unstable, however, that if heated, or even kept for some time exposed to the light, it splits up into its components hydrogen and iodine. Moreover, if chlorine is introduced into a vessel containing hydriodic acid, the chlorine immediately combines with the hydrogen of the hydriodic acid, forming hydrochloric acid, and setting the iodine free. Thus chlorine is said to have a greater *A*. for hydrogen than the iodine has.

Affirmation, a form of oath or declaration specially adapted to members of certain religious persuasions in place of the usual

oath, on the judge being satisfied that the recusant's motive is conscientious. The penalties of perjury are imposed on those who knowingly affirm falsely. See OATH.

Afrique, St., a town in the S. of France, dep. of Aveyron, on a feeder of the Tarn, 31 miles S. of Rhodéz, and 79 miles N.E. of Toulouse. It lies in a fine valley on the N. side of the Cevennes, in the midst of orchards and vineyards, has some cotton and woollen manufactures, and a large trade in *Roguefort cheese*, made from ewe-milk in the hill pastures, which was famous as long ago as the time of Pliny. Pop. (1872) 5071.

Afghanistan, a country of Asia (part of ancient *Ariana*), extends from lat. 28° to 38° N., and long. 62° to 73° E. It is 450 miles long, and 470 broad; its area 212,000 sq. miles, and the population differently estimated at from 5,000,000 to 9,000,000. A. is bounded N. by Turkestan, E. by the Punjab, S. by Beloochistan, and W. by Persia. Its mountainous character makes it a valuable barrier for the protection of India. In the E. the Suliman Mountains completely separate A. from the plains of the Punjab; the only passes are the ravine of the Cabul river, in the N., part of which is known as the Khyber Pass, and in the S. the Bolan Pass. The Hindu Kush Mountains, a continuation of the Himalayas, extend along the northern frontier, rising in alpine grandeur to heights of more than 20,000 feet. Owing to the inequality of surface and irregular distribution of water, the climate of A. varies greatly, and the products are most diversified. On the high tablelands of the N. the fruits of Europe grow wild; the fertile terraces produce aromatic herbs, tobacco, rhubarb, and asafoetida; luxuriant Indian vegetation covers the deep valleys; and in the southern plains cotton and sugar are cultivated. The only important rivers are the Cabul and Helmund. The country is rich in copper, iron, and other metals. The Afghans are a brave race, strongly influenced by national sentiment, but addicted to predatory strife, and treacherous beyond even Asiatic bounds. Their religion is Mohammedan after the Sunnite or 'orthodox' form, but toleration is extended to other creeds. The *Pushtu* language belongs to the Aryan family of languages, but whether to the Indian or Iranian branch is still uncertain. Poets are the only authors who employ the native language; all prose writings are in Persian. The name Afghan is Persian; the natives calling themselves *Pushtaneh* (pl. of *Pushtu*).

After many centuries of family feuds and harem intrigues, the history proper of A. begins with the advent of Ahmed Khan in 1747, who seized the moment when Persia was disturbed by the assassination of Nadir Shah (q. v.) to effect the independence of his country, and to make it one of the most powerful kingdoms in the East. He founded the Douranee dynasty, and was succeeded by Timur, who died 1793, and left the crown to be fought for by his three sons, Zemaun, Mahmud, and Shah Sujah. Zemaun first succeeded in obtaining supreme power; but after some years he was dethroned by his half-brother Mahmud, who in turn was compelled, by an insurrection of the Afghan chiefs, to abdicate in 1823. Dost Mohammed, one of these chiefs, made himself master of Cabul and Ghizni, and was recognised as virtual ruler of the country. Shah Sujah, full brother of Zemaun, and the legitimate sovereign, was expelled from A., and lived as a stipendiary on the British government at Loodianah, always keeping an eye on his lost kingdom. Dost Mohammed's foreign policy was to check the encroachments of Runjeet Singh (q. v.), the ruler of the Punjab, and to cripple the power of Persia. The close relations between Dost Mohammed and Russia induced the British government to sign a treaty of alliance with Runjeet Singh and Shah Sujah, at Lahore, 26th June 1838, for the purpose of replacing the latter on the throne of A. War was declared against Dost Mohammed (1st October 1838) by Lord Auckland, then Governor-General of India. A strong force, under Sir Alexander Burnes, advanced through the Bolan Pass, and reached Candahar, where Shah Sujah was formally placed on the throne. After the taking of Ghizni (q. v.) Dost Mohammed surrendered, and the supposition was that the country had been finally conquered. The British took up quarters at Cabul; but in the winter of 1841, when help from India was cut off, they were hemmed round, and forced, with every circumstance of humiliation, to evacuate the country. During the retreat by the Khyber Pass, the severity of the weather and cruelty of the enemy spared neither woman nor

child, and of a host numbering 15,000 only one man (Dr Brydon) reached Jelalabad. When the news of the disaster reached India, a fierce cry for vengeance arose. General Pollock was despatched by way of the Khyber Pass with a retributive force, and being joined by General Nott, who marched N. from Candahar, routed the Afghan army, releasing captives and devastating the country. It was not, however, till the battle of Gujerat, in 1849, that the Afghans were fairly subdued, along with their famous enemies the Sikhs. The consolidation of his empire occupied Dost Mohammed from this time till his death in 1863. He appointed as his heir Shere Ali, the third and favourite of his sixteen sons. The two elder brothers, who were thus disinherited, rebelled, and plunged the country into a civil war, which lasted for five years. Shere Ali (q. v.), however, firmly secured his position as Ameer, aided by British money and arms, and by the intelligence and bravery of his son Yakub Khan (q. v.). The latter rebelled in 1870, but was propitiated when made governor of Herat. In 1875, however, he was enticed to Cabul, and thrown into prison, from which he only emerged on the flight of his father in 1878. The subsequent history of A. has been a succession of startling and deplorable incidents. The occupation of Quetta (q. v.) by the British first awoke the suspicions of the Ameer that his independence was being threatened. Then followed in 1877 the rejection of Sir L. Pelly's proposal, which involved the reception of a British Resident at Cabul, the ostentatious welcome accorded to the Russian Embassy (1878), the affront a month later to the British Mission under Sir Neville Chamberlain at the mouth of the Khyber Pass, the victorious invasion of A. by the British, the flight and death of the Ameer, the accession of Yakub Khan, the treaty of peace concluded (May 30, 1879) with the conquerors, the massacre of Sir Louis Cavagnani and the members of the British Mission in Cabul (September 4), the return of the British troops, their reoccupation of the country, the execution of the assassins, and the abdication of the Ameer (October 19).

Afium Kara-Hissar (Opium Black Castle), a town of Asiatic Tu., vilayet of Anatolia, 170 miles N.E. of Smyrna. It derives its name partly from the opium grown in the neighbourhood, which forms a large part of the trade of the place, and partly from the lofty rock behind the city, which was once crowned with a fortress. A. is an entrepôt for the great trade between Smyrna and the interior of Asia, and it has also manufactures of saddlery, carpets, &c. Pop. estimated at 60,000.

Africa, the second in size of the great divisions of the globe, lies in the eastern hemisphere, and extends from lat. 37° 20' N. to 34° 50' S., and from long. 17° 34' to 51° 16' E. Its greatest length is about 5000 miles, its greatest breadth 4700, its area 11,700,000 sq. miles, and its coastline 15,000 miles. A. is shaped like an irregular triangle, having its vertex to the south, and is bounded N. by the Mediterranean, E. by the Red Sea and Indian Ocean, and W. by the Atlantic Ocean. It is joined to Asia by a narrow neck of land, which, however, has been cut through by the Suez Canal. There are few large gulfs and bays; the most important are the Gulfs of Sidra and Kabes (the greater and lesser Syrtes) on the N.; Suez, Aden, and Delagoa Bay on the E.; Algoa Bay on the S.; and the Gulf of Guinea on the W. The principal capes are Bon on the N.; Guardafui on the E.; Good Hope on the S.; and Verd on the W.

Chief Political Divisions.—N., Egypt, Tunis, Tripoli, Fezzan, Algeria, Morocco; E., Nubia, Abyssinia, Somali, Mozambique, Sofala, Natal, Kaffraria, Transvaal Republic, Orange River Free States; S., Cape Colony; W., Senegambia, Upper and Lower Guinea; interior, the States of Sudan.

Chief Islands.—Socotra, Seychelles, Comoro Islands, Madagascar, by far the largest, off the coasts of Mozambique, and Sofala, Mauritius, Reunion, St Helena, Ascension, Cape Verd Islands, Canary Islands, Madeira Islands, &c.

Physical Features, Mountains, &c.—1. The southern triangular part of A. consists of a large elevated tableland surrounded by mountain ranges. On the N. its boundary is undefined. The ridges on the W. and E. subside before reaching the sea, leaving belts of flat country on the coasts. The W. ranges have their highest point (13,000 feet) in the Cameroons, to the N.; the E. mountains are also highest (20,000 feet) towards the N., where they enter the mountainous district of Abyssinia. On the S. the mountains rise from the coast in three distinct stages,

having broad terraces or *barros* between them. Their highest point is about 10,000 feet. The tableland is composed partly of waste lands, such as the Desert of Kalihari, N. of Cape Colony, and partly of fertile and populous districts. Towards the E. edge, inland from Zanzibar and Mozambique, is the great lake district of A., containing the Albert and Victoria Nyanza, Lake Tanganyika, Lake Nyassa, Lake Bangweolo or Bemba, &c. Further S. is Lake Ngami. The principal rivers, besides the Upper Nile, are the Zambesi, of this division, which falls into the Mozambique Channel; the Orange River, the Congo, Coanga, and Ogowai, which fall into the Atlantic; and the imperfectly-known Luababa.

2. *Sudan*, comprising the whole of A. between the S. tableland and the Sahara, including on the W. the basin of the rivers Niger, Gambia, and Senegal, and having on the E. the mountainous region of Abyssinia, which occupies the space between the Nile basin and the Indian Ocean. In the centre is the very large alluvial basin of Lake Tchad. In the W. there are mountain ranges of no great elevation, in which the river Niger (the second largest in A.), which flows into the Gulf of Guinea, the Senegal and Gambia, which flow into the Atlantic, have their origin. On the E. we have the White Nile flowing from its source S. of the equator, and the Blue Nile, passing through Lake Tsana in Abyssinia, to join it at Khartum. The Welle is another large river towards the E. of this district.

3. The *Sahara* or Great Desert, between Sudan and the lands of the Mediterranean coast. This division consists of a vast undulating district of hard barren soil, with tracts of shifting sand, and occasional *oases*, spots of great fertility, owing their existence to subterranean springs. Over a great part of the Sahara rain never falls. It is a tableland of considerable elevation, and reaches in some peaks a height of 5000 or 6000 feet.

4. The regions of the Atlas Mountains, and Tripoli. The Atlas range extends across the N.W. corner of A., running through Morocco, Algeria, and Tunis. In the loftiest summits a height of upwards of 10,000 feet is attained. The southern slope of these mountains extends to the Sahara; the northern slope reaches to the sea, and in climate, productions, &c., is very similar to the opposite coast of Europe. There are numerous short rivers flowing into the Mediterranean, and several small lakes. Tripoli, further E., stretches along the Mediterranean coast for about 1000 miles. Near the sea it is very fertile, further inland it is barren. Fezzan, lying immediately S. of Tripoli, is the largest oasis in the Sahara.

5. The regions of the Nile, viz., Nubia and Egypt. A range of mountains runs along the whole coast of the Red Sea through Nubia and Egypt. On the W. side of these countries is a low ridge of hills separating them from the Sahara. Between the two ranges lies the fertile basin of the Nile. After the White Nile is joined by the Blue Nile at Khartum, the two roll on as a single river through Nubia and Egypt into the Mediterranean.

Climate.—A. lies almost wholly within the torrid zone, and is the hottest of the continents. The warmest part is N. of the equator, owing to the greater extent and less elevation of the northern half. The coasts of the S. and N. possess the climate of the temperate zones in which they lie. The flat regions next the sea are generally unhealthy, while the terraces a little inland enjoy an agreeable climate, and are made temperate by the proximity of the sea. The district of tropical rains extends from 25° S. lat. to about 20° N. lat. In the greater portion of the Sahara, and in the desert of Kalihari, rain never falls. The N. is much exposed to hot, dry winds from the Sahara.

Vegetation.—The vegetation of A., in the neighbourhood of the tropical rivers, and wherever humidity and heat are combined, is extraordinarily luxuriant, vigorous, and abundant in species, though, on the whole, less grand and varied than that of Asia or S. America. The productions of the temperate zones are found on the terraces in several parts of A. Among the most important wild plants are the baobab (*Adansonia*), butter-tree (*Bassia*), various palms, aloes, papyrus, gum-trees. Of cultivated plants the following, grown with success in many parts of A., may be mentioned: cotton, indigo, banana, maize, wheat, rice, vine, European fruits, durra, coffee (wild in Abyssinia), and sugar-cane.

Animals.—The wild animals of A. surpass those of similar kinds in other parts of the earth in strength and ferocity. The number of peculiar species is great, such as the giraffe, zebra, quagga, and the various kinds of antelopes (gnu, spring-

bok, &c.) The African elephant differs considerably from the Asiatic, and is nowhere tamed. Lions, leopards, hyenas, jackals, the hippopotamus, various species of the rhinoceros, monkeys (gorillas, chimpanzees), wart-hogs, &c., are abundant. Crocodiles (smaller than those of Asia) abound in the rivers, and there are many gigantic and poisonous snakes. Among birds are the ostrich, flamingo, secretary-bird, parrot, and bright-plumaged small birds in great variety, though few songsters. Locusts appear in enormous hosts, and often do great damage; the ant species is numerous; and the tsetse fly in S. A. has earned for itself an evil reputation from its destruction of cattle. The most important of the domesticated animals are the horse (Barbary, Abyssinian, Nubian), the camel and dromedary (introduced from Arabia), asses, oxen, cattle, sheep, and goats. These are found in all parts of the continent.

Minerals.—The mineral wealth of A. is but imperfectly known. Salt is very generally diffused, though large tracts, such as Sudan, are without it. Egypt and Abyssinia are rich in minerals. Gold is found in the sands of nearly all the great rivers. The diamond-fields of Griqualand, in the S., have proved very productive, and coal has been found in the eastern part of the southern plateau. The geological formation of the known districts of A. is treated under their various headings.

Population.—The population of A. is estimated at about 190,000,000. N. of the Sudan, the Berber race prevails from the Atlas Mountains to Libya; the Nubians are partly of Arab and partly of Negro origin, while the Copts of Egypt belong probably to the Semitic family, but the frequent conquests and colonisations of the N. African sea-board both in early and later times have complicated the question of race. Turks are numerous in Tunis, Tripoli, and Egypt. The middle of A. is peopled almost entirely by the Ethiopian or Negro family, and the S. is occupied by the Hottentots and Kaffirs—members, probably, of the same great family. European colonists are numerous in the islands and coasts, especially in Cape Colony and Algeria.

Religion.—Mohammedanism has about 67,000,000 votaries N. of 10° N. lat. Christianity is found among the Europeans, and, in a corrupt form, in Abyssinia. It embraces about 9,000,000 people. There are about 1,000,000 Jews. The remaining 113,000,000 are heathens, following varieties of fetishism, &c.

Government.—There are few great organised states, except those on the N. coast, the most important of which is certainly Egypt. Zanzibar, on the E. coast, may also claim notice, but despotic or patriarchal governments prevail. Algeria and Cape Colony are the chief of the European possessions, which are less important than those of Asia and America.

Science, Art, Literature.—These may be said to be unknown among the natives. There are schools for teaching the Koran in all Mohammedan districts.

Commerce.—The trade of A. is in a great measure carried on by barter. The internal trade is in the hands of the Arabs, and (in Sudan) the Mandingoes and Fulahs. It is conducted by caravans crossing the interior, especially the deserts of the N. The coast trade is chiefly in the hands of the Europeans. The principal exports are coffee, sugar, rice, dates, palm-oil, gum, cotton, ivory, spices, ground-nut, timber, hides, ostrich-feathers, musk, wax, and gold-dust. The traffic in slaves has been a great blot on African commerce, the slaves being brought from the interior to the coasts. In 1873 Great Britain made a treaty with the Sultan of Zanzibar, by which he agreed to abolish slavery in his dominions; and Sir Samuel Baker returned in the same year from a successful expedition up the Nile, organised by the Khedive of Egypt, ostensibly for the purpose of putting down the slave traffic. Until the slave trade is extinct, the legitimate commerce of A. cannot be fully developed.

Agriculture is prosecuted on a large scale and in an effective manner on the coasts, in the Nile Valley, Abyssinia, Sudan Cape Colony, and Kaffraria.

Mining is carried on in Upper Sudan, Abyssinia, and Kaffraria. The Kaffirs are skilful miners.

Explorations.—The early name of this continent was Libya, Africa having been originally merely the Roman province in which Carthage was situated. Until the 15th c., Europeans knew little of A. except the N. coast; but explorers have been numerous since Vasco da Gama doubled the Cape of Good Hope in 1497. Nothing more can be attempted here than a list of a few of the greatest travellers in the present century

which has been the great era of African exploration. The travels of Mungo Park in the valley of the Niger; of Burckhardt in Nubia; of Oudney, Clapperton, Denham, Lander, and Barth in the Sahara and Sudan; of Burton, Speke, Grant, Baker, and Stanley in the valley of the Nile; and of Moffat in S. A., have resulted in great discoveries, and in vast additions to our stock of geographical knowledge, for a special notice of which we refer to the names of the explorers. David Livingstone, however, is the greatest name in the annals of African exploration. He devoted twenty-five years to making known to us the interior of S. A., where he finally lost his life in 1873. In the end of 1874 the important discovery of an affluent on the western side of Lake Tanganyika was made by Lieutenant Cameron, and in 1877 Stanley traced the course of the Congo, and proved it to be the river which Livingstone had mistaken for the Nile.

African Teak, or African Oak, is a wood of much value in shipbuilding, for which it is generally imported. It is very durable, but rather heavy. The tree is called *Oldfieldia africana*, and belongs to the natural order *Euphorbiaceæ*.

Agâ, or Agha, in old Turkish, means the elder brother, but in modern Turkish is given as a title of honour to illiterate dignitaries. It is therefore used in contrast to Effendi, which is never given except to those who possess, in addition to rank, literary culture. The title acquired its greatest historical distinction in the time of the Janissaries, whose commander was an A.; now the only high officer who bears it is the chief of the Black Eunuchs.

Agâdes, a town of Central Africa, the capital of Air or Asben (q. v.), situated, S. of the Sahara, in lat. 16° 33' N., long. 7° 30' E. It was formerly a prosperous city, and before the decline of the gold trade of Gogo had probably 60,000 inhabitants. Though it still sends out caravans to the rich marts of the Sudan, its trade is trifling, and the population has dwindled to about 6000. The people are partly of Berber descent.

Agama, a genus embracing numerous species of saurian reptiles, natives of warm climates. They have a loose skin, which can be distended with air at the animal's will. Certain S. American species are called chameleons, owing to their power of changing their colours like the true chameleon. The frilled A. is a singular species found in Australia.

Agamemnon, son of Atreus, and brother of Menelaus, whose wife Helen was carried off by Paris, son of Priam, King of Troy. The Greek chiefs made A. generalissimo of the forces which they had collected to punish Troy. At the close of the siege, returning home with Cassandra, the daughter of Priam, A. was murdered by his wife Clytemnestra, who had been seduced during his absence by Ægisthus. His children—Iphigenia, Electra, and Orestes—were favourite subjects of Greek tragedy.

Agami, or gold-breasted trumpeter-bird of S. America. It is the *Prophias crepitans* of zoologists; is rather larger than a domestic fowl, but has much longer legs and neck. It runs very swiftly and is easy of domestication.

Agapæ (Gr. *agapê*, love), in the primitive Christian Church, were the feasts of brotherly love that accompanied the celebration of the Eucharist. The two together were originally regarded as a whole, which was spoken of as the 'Lord's Supper' (Gr. *deipnon tou kuriou*). In the early apologists and fathers of the Church, Justin, Tertullian, Chrysostom, &c., we find a full description of the A. They were provided by the richer brethren; they were introduced and closed by prayer, and, according to Tertullian, every one during the feast was required to sing something to the praise of God either from Scripture or his own thoughts, so that it soon became visible if any one had partaken to excess. Pliny, in his famous letter to Trajan, alludes to these A., and mentions the sobriety with which they were conducted; he also indicates the prevalent but erroneous suspicion of the pagan magistrates that they were secret societies, and had sinister political aims. From a very early period, however, a tendency to irregularity in the celebration of the A. had shown itself. St Paul (1 Cor. xi. 20-22) earnestly rebukes it, and though the persecutions would repress selfish and sensual indulgence, yet it was found advisable in the 2d c.

to separate the A. from the celebration of the Eucharist. After the establishment of Christianity in the 4th c. the A. were placed under strict regulations by ecclesiastical councils, they were not allowed to be held in church. A distinction is made between the Eucharistic love-feasts, and others of which we read in ecclesiastical writers; as *A. natalitia*, held in honour of the martyrs; *A. connubiales*, which were simply marriage-feasts, and *A. funerales*, or funeral-feasts.

In modern times the Moravians, the Wesleyans, and the Glassites hold love-feasts in connection with the celebration of the Eucharist.

Agapem'one (Gr. 'abode of love'), a curious religious establishment near Bridgewater, in Somersetshire, set up in 1859 by a Mr Henry James Prince, at one time a clergyman of the Church of England. While curate at Charlynch, in the same county, he first began to preach certain mystical doctrines about himself and the Holy Ghost, which excited great scandal and alarm, and led to his withdrawal to Suffolk. Here matters grew worse with him, and after holding a conference with some clerical adherents whom he had secured, it was resolved to secede from the Church. Prince started preaching on his own account at Brighton, and his principal ally, Starkey (who had formerly been his rector), at Weymouth, in Dorsetshire. Both met with great success in various quarters, and among different orders of society. At last three of the brethren, Prince, Thomas, and Cobbe, crowned their good fortune by marrying three lovely and wealthy girls, daughters of a widow of the name of Notridge. With the money thus obtained all went on admirably for a time, but at last (1846) Mrs Thomas became discontented with her situation, and was expelled from the society. This led to legal proceedings (1850), in which she sought (successfully) to obtain the custody of her child. The revelations of the 'inner life' of this strange community did not tend to elevate it in public estimation, and if Mr Hepworth Dixon's account (*Spiritual Wives*, 2 vols., 1868) of his interview with Prince is not overcharged, its singular sentiments and usages are still maintained. Meanwhile the 'abode of love' at Spaxton, near Bridgewater, was getting ready, and in 1859 it became the final residence of these strange saints. Prince has been a zealous pamphleteer all his life, but it is scarcely possible for a sane mind to understand his mysterious and apparently impure jargon about the redemption of the flesh. In 1859 appeared *Brother Prince's Journal, an Account of the Destruction of the Works of the Devil in the Human Soul by the Lord Jesus Christ through the Gospel*, in which he calmly expresses his belief that he has at length reached perfection, and cannot possibly become better than he is. The sect is still (1875) in existence, but is making no further progress. It vegetates rather than lives in the sleepy luxury of Spaxton, and must perish with its founders.

Agaricus. One of the largest and most important genera of fungi. See MUSHROOM.

Agass'iz, Louis Jean Rodolphe, a distinguished naturalist, was born May 28, 1807, at Motiers, between the lakes of Neuchâtel and Morat, in the canton of Freyburg, Switzerland, received his earlier education at the Gymnasium of Bienne and the Academy of Lausanne, and studied medicine and the experimental sciences at Zürich, Heidelberg, and Munich, where he took the degree of M.D. In 1829 he published an account and classification of 116 species of fish collected by Spix; and having by this means been attracted to the study of ichthyology, he published from 1839 to 1845 three volumes entitled *Natural History of the Fresh-Water Fish of Europe*. At the same time appeared *Researches on Fossil Fishes, and Descriptions of Echinodermes*. His best and most generally known work is his *Study of Glaciers*, which he supplemented by his *Researches*



Agaricus campestris (Common Mushroom).

of *Glaciers* (Paris, 1847). In 1846 A. removed to America, and became Professor of Geology and Zoology in the Lawrence Scientific School at Harvard; and subsequently explored extensive portions of the New World, accompanied an expedition to Brazil (1865-66), and superintended deep-sea soundings in the Gulf Stream (1871). In his *Outlines of Comparative Physiology* (1848) he has advocated the anti-evolution theory. A. died Dec. 14, 1873.

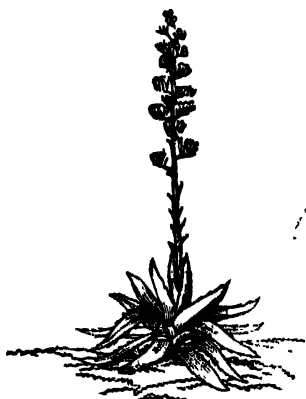
A'gata de Goti, Santa, an episcopal city in the S. of Italy, province of Benevento, 14 miles E. of Capua, lies on a hill, at the base of which flows a tributary of the Volturno. Besides the cathedral it has seven other churches and an abbey. Pop. 7951.

Ag'ate, a siliceous mineral, composed of closely-compressed layers of coloured varieties of quartz, capable of a fine polish, and much used in the manufacture of ornaments. It is found in Saxony, Scotland, Siberia, India, Java, Arabia, and other countries.

Ag'atha, St., according to the legend of her life, was the daughter of a Sicilian nobleman, and was celebrated for her beauty and wealth. When the Decian persecution of the Christians broke out in the middle of the 3d c. A.D., she steadfastly refused to save her life by granting unworthy favours to the Roman prefect Quintianus, and was in consequence put to death with horrible cruelties, 5th February 251, which is the day dedicated to her in the Catholic calendar of the saints.

Agath'ocles, a Sicilian Greek of humble birth, born at Therma, in Sicily (B.C. 361). Having married the widow of his patron, Damas of Syracuse, he obtained great wealth, which enabled him to collect an army, by the aid of which he made himself sovereign of Syracuse. His rule was marked by oppression and cruelty. In an attempt to expel the Carthaginians he was defeated at Himera, but passing over into Africa, his successes were rapid and brilliant. In a mutiny which followed a defeat there, his son was slain, but he himself escaped, and returning to Sicily, he re-established his authority. His grandson, Archagathus, having killed the heir to the throne, that he might obtain it himself, caused his grandfather, aged seventy-two, to be destroyed by a poisoned quill, used as a toothpick (B.C. 289).

Ag'ave. A genus of monocotyledonous plants belonging to the order *Amaryllidacea*, principally natives of S. America. They have large, succulent, spiny leaves, forming a spreading tuft, from the centre of which the flowering stem is developed. The *A. americana*, which is cultivated in conservatories in Britain, is the best known species. It is commonly called the American



Agave.

and roots furnish a coarse but tough fibre called Pita flax or Maguay, which is used for making ropes and paper. The juice of the leaves has been used as a substitute for soap, and forms a lather with salt as well as with fresh water. The roots of *A. saponaria* are employed in the same way. The Mexican Indians ferment the juice of *A. mexicana*, which forms an intoxicating drink called *pulque*.

Agde, a walled town of France, on the left bank of the Hérault, about a league from the Gulf of Lyons. It was founded by Greek colonists. From the dismal aspect of the basalt of which it is built it has been called the Black Town. The trade of A. is rapidly increasing, and is chiefly in wine, oil, salt, corn, silk, wool, and timber. It has an active coasting trade, and considerable commerce with Spain, Italy, and Africa. Pop. (1872) 7843.

Age. A man or woman is said in law to have arrived at 'age' on the day preceding the twenty-first anniversary of his or her birthday. In English law the boy or girl under twenty-one is called an *infant*, and relatively to the person having charge of him or her a *ward*. If an estate be left to an infant, the father is by common law the guardian, and must account to his child for the profits. A father may by deed or will appoint a guardian. A male at twelve years old may take the oath of allegiance; at fourteen he may consent or not to marriage; at twenty-one he is at his own disposal. A female at seven may be betrothed or given in marriage; at nine is entitled to dower; at twelve may consent or not to marriage; and at twenty-one may dispose of herself and lands. Marrying a ward of Chancery without consent of the court is 'contempt, and as such punishable, even though the offender be ignorant of the wardship. In Scotland the period of life under twenty-one, or minority, is subdivided into *pupilarity* and *puberty*. In a male pupilarity extends to fourteen years of A., in a female to twelve. In both puberty is the period between pupilarity and twenty-one, or *majority*. A minor who has reached puberty may take an oath and give evidence. No one under twenty-one can vote at an election for member of Parliament, or be elected a member. In France the male marriageable A. is eighteen, the female fifteen. In America a member of the House of Representatives must be twenty-five, of the Senate thirty. See INFANTS, LIABILITIES OF, CONSENT, CONTRACT, MARRIAGE.

Agen, an old episcopal town in France, capital of the dep. of Lot-et-Garonne, stands on the right bank of the Garonne, midway between Toulouse and Bordeaux. In early times it was plundered successively by Goths, Vandals, Huns, and Saracens. The English held it in the reign of Henry II., and in the 16th c. it was twice captured by the Huguenots. Joseph Scaliger was born in the immediate neighbourhood, and long lived in A., which now carries on a prosperous trade in woollen fabrics, sailcloth, colours, hemp, brandy, and plums. Pop. (1872) 15,752.

Agent, one authorised to act for another. An A. cannot bind his principal by deed, unless empowered by deed to do so. Authority given him is revocable at any time, and falls by the death or bankruptcy of the constituent. An A. must act in good faith and according to business usage; he must act with due diligence and skill: if he fail in these points his principal can recover damage. An A. must keep accounts, and duly inform his principal of material acts. He is entitled to remuneration, and has a 'lien' (Scot. Law Hypothec, q. v.—see LIEN) over property in possession, both for incidental charges and for the general balance due to him. An A. acting gratuitously must act in good faith, but he is not answerable for want of skill, or even for carelessness. See FACTOR, BROKER, COMMISSIONER, COMMISSION AGENT, MASTER AND SERVANT.

Agent and Client. The constituent of a law agent is called his client. The general principles of law given above apply in this relationship. The law agent has a 'lien' (Scot. law hypothec) over deeds and other papers in his possession for his account against his client; and the client has a claim for damage against an agent acting with gross professional ignorance. The agent is not responsible for a result, whatever opinion he may have given. See ATTORNEY, SOLICITOR, WRITER TO THE SIGNET.

Agent, Army, an official chosen by the colonel of a regiment, who is answerable for his honesty to the Crown. His functions are to apply to the War-Office when money is required to pay the officers and men, and other regimental charges. He also assists the private soldiers in remitting money to their families, and in their other pecuniary arrangements. He accounts annually directly with the Paymaster of the Forces. The tendency of recent years has been to curtail the functions and emoluments of the office; and many competent authorities have been in favour of its abolition, on the ground of its causing an unnecessary complication and expense.

Agent, Navy. By 27 and 28 Vict. c. 24, each of H.M. ships of war, while in commission, have an agent appointed by the commander, and registered. His duties are to act for the ship in questions of salvage, merchant shipping law, capture of slave-ships, distribution of prize-money, &c. He receives 2½ per cent. as payment in full for his services.

Ages, a term of unprecise import used to denote supposed periods in the history of the human race. The idea first occurs in Greek writers. Hesiod reckons five A.—the golden, the silver, the brazen, the heroic, and the iron. The first was, of course, the purest and best; the others marked a gradual deterioration, except perhaps the heroic, which was a sort of wild desire for a better state of things; and the last, or iron age, in which the poet himself lived, was one in which all virtue and goodness had departed from the earth. From poetry the idea passed into the speculative philosophy of the Greeks. The cosmos, or universe, had now its A. These formed the divisions of a great world-year, on the completion of which the events of history repeated themselves. The Apocalypse seems to sanction the notion, which is also to be found in the ancient literature of the Hindus, and, with modifications, in the recent metaphysicians of Germany and the positivists of France.

Agésilas, King of Sparta, succeeded to the throne (B.C. 398) while the hegemony or leadership of Sparta was still uncontested. Two years later, to aid the Ionians, he crossed into Asia and defeated the satraps of Artaxerxes (B.C. 395). Being summoned home to suppress a rising of the Greek states against Spartan authority, he defeated his enemies at Coroncia (394 B.C.). He approved of the treacherous seizure of the *Cadmeia*, or citadel of Thebes, and was therefore responsible for the subsequent reverses that befell his country, though his heroism in the field continued unabated. A. died in Egypt A.D. 361, in his eighty-fourth year, a true Spartan, but not a great Greek.

Agincourt, or Azincourt, a village in the dep. of Pas-de-Calais, France, where Henry V. of England, with from 10,000 to 14,000 men, defeated about 60,000 French on the 25th October 1415. Not fewer than 10,000 French were slain, including 'princes of the blood, feudatories of the crown, warlike bishops, and innumerable knights;' among the prisoners were the Dukes of Orleans and Bourbon. The English lost some 1600, among whom were the Duke of York and the Earl of Suffolk. This brilliant victory occurred after the siege of Harfleur, while King Henry was returning to Calais with his sadly-reduced forces.

Agis, the name of several Spartan kings, the first of whom is said to have reigned in the 11th c. B.C. The second flourished in the 5th and the third in the 4th c. B.C. A. IV. commenced his eventful reign in 244 B.C. The Spartans had then greatly degenerated, the old simplicity and virtue having given place to luxury and its kindred vices, and A. resolved to restore the ancient discipline. As the land was possessed by only a few families, while the poor were overwhelmed with debt, A. proposed a cancelling of debts, and a redistribution of the land, as to the first of which he was strongly seconded by a large landowner called Agésilas, who was himself involved in debt, but who contrived to delay the execution of the second to save his own estates. This incensed the poorer classes, who had hitherto been the chief supporters of A., and they permitted his enemies to throw him into prison, where he was strangled (240 B.C.).

Ag'rate (Lat. *agnatus*, 'a kinsman by birth') is the name given both in English and Scotch law to persons related through the father, those related through the mother being termed 'cognate.' This is not exactly the meaning the word had in Roman law. There the A. denoted strictly a relationship not only to, but also *through males*; e.g., a brother's son was his uncle's A., but a sister's son was his uncle's cognate, because the relationship was preserved by means of a *female*. The origin of the Roman distinction is to be sought in the institution known as the *patria potestas*, and the reason why a different distinction exists in modern law is that the *patria potestas* in its ancient sense has not been introduced into any modern society.

Agnes, St. according to the legend of her life, was born at Rome, and on account of her beauty and wealth obtained in her thirteenth year, from Symphronius, the son of the Roman prætor, an offer of marriage, which, being a pious Christian, she declined.

The enraged youth then caused her to be publicly stripped naked, but her long hair fell down to her feet and clothed her like a garment. When Symphronius sought to approach her with unchaste looks, he fell to the ground, bereft of eyesight. At the entreaties of his friends, she caused his sight to be restored. She was then condemned to be burnt, but the sportive flames refused to touch her body. At last she was beheaded A.D. 303. Her emblem is a lamb, perhaps from the similarity of the Latin word for a lamb (*agnus*). Her day is the 29th of January. Readers of Keats will remember the line—

'St Agnes' Eve, ah, bitter chill it was!'

Agne'si, Maria, Gaetana, an Italian lady, was born at Milan, 16th March 1718, and at an early age was distinguished for her knowledge of Greek, Latin, French, Spanish, German, and various Oriental languages. She next betook herself to mathematics, and in 1748 published her *Istituzioni Analitiche*. When thirty-two years of age, she succeeded her father as professor of mathematics in the University of Bologna. Subsequently she retired from learned society, became a nun, and devoted her whole time to works of charity. A. died August 4, 1799. See *Vita di Mar. Gatt. Agnesi*, by Bianca Milesi-Mojon, Milan, 1836.

Agno'ne, a town in the S. of Italy, province of Campobano, 22 miles N.W. of the town of Campobano, has large copper-works. Pop. 10,500.

Ag'nus Dei (Lat. 'Lamb of God'), a name given to Jesus by John the Baptist (John i. 29). In the liturgy of the Roman Catholic Church it is also the name of a prayer, which since the close of the 6th c. (when it was first enjoined by Pope Gregory the Great) has been used by the priest during the service of the Mass shortly before the communion, who recites three times, *Agnus Dei, qui tollis peccata mundi, miserere nobis* ('O Lamb of God, who takest away the sins of the world, have mercy upon us!') except that in the third repetition of the prayer, *da nobis pacem* ('give us peace') is substituted for *miserere nobis*. Pope Sergius I. (7th c.) commanded this prayer to be sung both by the priest and the congregation during the consecration of the Host. Still later the name was given to an oval-shaped medal of wax, silver, or gold, on which was stamped the figure of a lamb bearing a cross.

Agos'ta, a fortified town on the E. coast of Sicily, 12 miles N. of Syracuse, on a rocky isle connected by a bridge with the peninsula of Santa Croce. The harbour is large and safe, but not easy of access. The chief export is salt, but a trade is also carried on in wine, oil, flax, honey, sardines, &c. Pop. 9735. A. was founded by the Emperor Frederick II. in 1229, and suffered severely in the Sicilian wars of the middle ages. It was the scene (1676) of a great defeat of the combined Dutch and Spanish fleets under De Ruyter by the French under Admiral Duquesne. In this battle De Ruyter got his death-wound. A. was destroyed by an earthquake in 1693.

Agou'ti (*Dasyprocta*), a genus of mammals belonging to the Guinea-pig tribe of the *Rodentia*. The species are natives of S. America and the W. India Islands, and resemble the hare and rabbit in their form and manner of living. One species is very destructive to sugar-cane plantations.

Ag'ra, the chief city of the N.W. Provinces, British India, 139 miles S.S.E. of Delhi by rail, is the seat of the government, and headquarters of the military force for the N.W. Provinces. Its cantonment can accommodate 10,000 troops. The daily market is well supplied with meat and vegetables. The Agra Banking Co., 'Agra Prize,' Assembly Rooms, 'Metcalf's Testimonial' (dancing-room and refectory), and the churches and chapels are prominent institutions. The *Taj Mahal*, mausoleum of Shah Jehan and his consort, is a beautiful building of marble, dazzling white, carved and ornamented with imitations of flowers in precious stones, many of which, however, were removed during the mutiny (1857-59). The building of this tomb occupied 20,000 men for twenty-two years, and cost over £5,000,000. The Pearl Mosque is a marvel of architectural and decorative beauty. Pop. (1872) 142,661, engaged in the cotton, salt, and transit trade. During the mutiny the Europeans, to the number of 5846, took refuge in the *fort*, an important stronghold with a rampart 80 feet high, which was gallantly relieved by Colonel Greathed. The garrison made several effective sallies; but the most brilliant

exploit was Major Montgomery's march to Allypurb, where, with 300 men, he defeated a vastly outnumbering force of rebels.—The British district of A. is populous and fertile, yielding chiefly cotton, flax, tobacco, maize, and some rice. Area 1887 sq. miles. Pop. (1872) 1,094,184.

Agra-agra (*Plocaria candida*), a sea-weed which is occasionally imported into this country for making a jelly for dressing silks. It is used as an article of food in India and China. When boiled in syrup or sugar it forms an excellent preserve.

Agram, a fortified town of Austria, capital of the crown-land of Croatia, pleasantly situated at the base of a woody mountain range. It is cut by a stream into three divisions, each having a distinct jurisdiction. The town is, on the whole, well built, and contains a royal academy and public library. Its trade is chiefly in porcelain, silk, tobacco, and wheat. Pop. (1869) 119,857.

Agrarian Law. In the Roman State there were two kinds of land, public and private, and till the time of the Licinian rogation, or bill, the public land was held only by the patricians, who formed the original *populus*, or burgesses. For liberty to cultivate this an exaction was made of a tenth of the produce of arable land, and a fifth of the produce of oliveyards and vineyards, while a rate was fixed for the right to pasture. Gradually the rich, by force or purchase, got possession of the smaller holdings, and thus became cultivators of extensive tracts. Though the land was the property of the State, and the cultivators mere tenants-at-will, long possession produced the feeling of ownership, and the land was regularly transferred by sale. The State, however, occasionally asserted its rights. When the plebeians, as distinguished from the patricians or original burgesses, became a separate estate, they claimed a share in that portion at least of the public land that had been acquired by conquest, and many difficulties arose between the two estates, which were attempted to be settled by enacting agrarian laws, which are not to be confounded with the modern proposal of an equal division of the lands of the rich among the poor. The A. L. of Spurius Cassius (B.C. 484) proposed that the unassigned portion of the public land should be divided among the plebeians, and that the rent or tithe of the remainder should be exacted, and applied to the payment of the army. It never, however, came into operation, as its author was put to death in the following year. By the A. L. of C. Licinius Stolo (B.C. 367) no occupier was to have more than 500 acres, and the surplus was to be divided among the plebeians, at the rate of seven acres each. After a time the Licinian law began to be disregarded, and at length Tiberius Sempronius Gracchus (B.C. 133) revived the measure for restricting the possession of public land to 500 acres, giving each son of a possessor 250 acres additional; while the land resumed was to be distributed among the poorer citizens, who were not to have the power of alienating their allotments. This measure Gracchus carried in spite of the opposition of the patricians, but he lost his life in a riot excited by his legislation. The Sempronian law was not repealed, but it became virtually inoperative, and shortly after the death of its author the clause forbidding the alienation of allotments was rescinded, and they naturally fell into the hands of the rich, who soon became again possessed of overgrown estates. Other agrarian laws, such as those that proposed the division of conquered lands among veteran soldiers, were less violently opposed. Various objects were contemplated by this system, one of the least satisfactory of which was the extending of the influence of a popular leader. As a means of relieving the wants of the poor these laws were a failure, for the refuse of a large city never prove efficient cultivators, as they have neither patience nor skill.

Agricola, Gnaeus or Oneius Julius, a Roman commander and statesman, born at Forum Julii (mod. Fréjus, in Provence), 37 A.D., commenced his military career in Britain under Suetonius Paulinus, 60 A.D. After holding many civil offices he was elected consul, 77 A.D. Next year he was made Governor of Britain, the greater portion of which he subdued. He defeated the Caledonians in the great battle of the Grampians, circumnavigated Britain, built a chain of forts between the Clyde and the Forth, and introduced civilisation into the island. Being recalled by the jealousy of Domitian, he lived in privacy till his death, A.D. 93. His life by Tacitus, his son-in-law, is a biographical masterpiece.

Agricola, Johann, a notable German theologian and writer, surnamed *Magister Isidorus*, from his place of birth, Eisleben, in Saxony, but whose real name was Schneider or Schnitter, was born 20th April 1492. In 1525 he was sent to Frankfurt to establish the Protestant worship, and on his return became a preacher in his native town, where he remained till 1536. Meanwhile his opinions began to change in the direction of Antinomianism, and when called to Wittenberg in 1537 a rupture took place between him and Luther. After some persecution he found a refuge in Brandenburg. He died at Berlin 22d September 1566. A. was a man of bold and active genius, but he had not much discretion, and his career was therefore stormy and distracted with quarrels. Besides numerous theological writings, some Church hymns, and a tragedy, he published in Low German a truly national work, full of strong sense, pure morality, and hearty patriotism, *Die gemeinen Deutschen Sprichwörter mit ihrer Auslegung* ('Common German Proverbs, with their Explanation,' Magdeb. 1528); shortly after, in High German, under the title *Dreyhundert Gemeiner Sprichwörter* (Nurnb. 1529); and later still, *Siebenhundert und Fünffzig Deutscher Sprichwörter* (Hagenau, 1534).

Agricola, Rudolphus, properly *Roelof Huyamann* ('husbandman,' Latinised into A.), and also, from his fatherland, *Frisius*, one of the most distinguished restorers of classical literature in Germany in the 15th c., was born at Babelo, near Groningen, in Friesland, in 1443. After studying at Louvain and Paris, he went to Italy, where he stayed two years. On his return to Germany in 1479, he did much by his lectures and otherwise to revive a taste for ancient literature. His principal work, *De Inventione Dialecticæ*, was mostly written while on a journey to Rome with the Bishop of Worms in 1485; but his fame rests not so much upon his written works as upon his personal influence at that period. He died at Worms in 1485. See Trusling's *Vita et Merita Rud. Agricolæ* (Gron. 1830).

Agriculture, a word derived from the Latin, signifying the tillage of a plot or field of land. From the time that 'Adam delved,' the culture of the ground has been one of the chief industries of man. A system of mixed husbandry has prevailed from primeval ages, and no better method of supplying corn and cattle for the food of the population of the earth has ever been devised. Since the abolition of the Corn Laws in the United Kingdom, the question has constantly cropped up as to whether the growing of corn or the rearing of cattle is the most profitable method for the farmer to adopt. During the Crimean war prices of wheat rose to a height unprecedented, except in the days when the 'Iron Duke' waged deadly feud in the Peninsula against Napoleon. In 1812 foreign growers were deluged from entrance to English ports; in 1856 they were not, and yet the prices obtained by British farmers in the latter period were nearly equal to those realised before that Act which gave a 'free loaf' to the people. What was the result of these high values placed upon wheat? A general recommendation that all or nearly all pasture-lands should be subjected to the operation of the plough. Cattle and sheep were at that time rather a sluggish trade in the market. Wool had to be sold at a moderate rate, and stock-farmers had the worst of it. The grazing lands were broken up, and before the value of the manures had been high exhausted, corn slid down the scale and meat went up. Meat has continued at high rates, and it is urged now (1875) that grass should be more extensively cultivated than it is. One reason, besides the high price of meat, given for this course of cultivation, or rather the negation of cultivation, is that much horse and manual labour might be saved. Horses are very dear, the average value of a good farm-horse being about £60 to £80; and wages of agricultural labourers have increased in proportionate ratio with that of the equine quadrupeds. It is a mistake to recommend all grass and no corn. The land requires change. It is not possible to develop it to its full extent without varying the rotations in ordinary farming practice. The land, like that mythical boy Jack, if it have no play, is a dull clod. It is not necessary, however, that it should lie bare fallow, although in some cases on heavy soils, where weeds have congregated, owing to the unpropitiousness of the season, entire non-production for one year might be recouped by the succeeding one, if due care were expended on the choice of good seed and the after tidiness and carefulness of treatment. Mr Lawes, the great experimentalist, has grown successive crops of

barley on his farm at Rothamsted for twenty-three years (up to 1875), but it would be unadvisable for all farmers to follow his example. Before such continuous rotation is resolved upon, the soil and climate ought to be thoroughly understood, and looking generally at farms where rent must be paid out of profit, it would not be very wise to farm on a fourth for the rotation, or at the most a sixth.

The practice of conducting A. has so much changed within a quarter of a century, that the old modes of tilling the soil may be passed by with a reference. The land was scratched to a depth of some three or four inches, and grain was scattered upon it at the discretion of the sower. His hand was not always judiciously steadied, or else the wind came and blew the seed upon furrows which wanted not. The consequence was that at harvest-time the fields exhibited much 'patchiness.' On some places there proved not to be tenfold return where a hundredfold might have been expected. There is not much danger of such blank spaces occurring now in fields, because the drills which the ingenuity of agricultural mechanists have invented are nearly proof against wind and weather.

A., not long out of its cradle in the United Kingdom, is still wrapped in its swaddling-clothes in most other countries on the continent of Europe and our colonies. Reaping-machines, by saving labour, have given a stimulus to the practice of A., and tended to an increase of rents in some districts. Portable threshing-machines proved a great boon to agriculturists. In out-of-the-way districts they quite superseded the flail and the cumbersome horse-gearing machines, and even the fixed steam-machinery, as it was found cheaper to employ these peripatetic severers of the corn from the chaff than to light unwonted fires and burn expensive coals.

After drainage A. in this country depends more for success upon steam-ploughing than on any other *modus operandi* on the farm. The success which has attended the working of the various systems in use has been very marked. It is claimed for these steam-drawn ploughs, cultivators, and grubbers that they can accomplish work at seasons when horse-ploughs would not be able to overtake it. They can achieve thorough tilth at a time when the pressure of horses' hoofs upon the land would be extremely inimical to the growth of the seed soon after. The hollows horses make leave the land water-logged at every step, and consequently at every step the grain falling thereon is doomed to blight.

Half of the land in occupation is not cultivated properly, because the tenants do not get security for their capital. Were they to drain and manure, and feed, off cake in their stalls or sheds for cattle, and on turnips for the sheep, the fertility of the land would be immensely improved. Leases are the safest agreements that a tenant can have, however good the landlord's intentions may be. A new landlord might come in after the one that the farmer had bargained with, and in England dismiss him with a six months' notice.

Wheat, barley, oats are the principal cereals in Great Britain. Roots are now one of the best paying crops—potatoes particularly so, if that wondrous malady, about the origin of which so many doctors differ, did not every now and again appear in their midst.

It has been said that there are scarcely any small holdings in England. There are nearly 230,000, ranging between five and twenty acres, and very nearly half of these are not above the smaller figure. There is therefore a fair opportunity for the frugal agricultural labourer to obtain a plot.

Up to the end of 1874 there were 47,143,000 acres under crops, bare fallow, and grass. To look after the land there were, including farmers, graziers, and bailiffs, 1,246,000 persons in England and Wales; in Scotland 220,000, and in Ireland 931,706. From these figures it would appear that Scotland can accomplish better work at a smaller expenditure of labour than other countries.

It has been thought sufficient here to give a general sketch of A. as it stands at the present time, reserving other information for special heads, such as Agricultural Implements, Agricultural Societies, Agricultural Education, Chambers of Agriculture, Land Tenure, Leases, Rural Cottages, Game Laws, Irrigation, Sewage, Tillage, &c.

Agricultural Customs. In 1848 Mr Philip Pusey, an eminent agriculturist, obtained a Parliamentary Committee of the

House of Commons to inquire into the A. C. of England and Wales in respect to tenant right. The evidence taken was very voluminous, embracing information from all the principal agricultural counties in England. An admirable digest of this unwieldy blue-book was made by Messrs William Shaw and Henry Corbet of the *Mark Lane Express*, and published by Ridgeway, Piccadilly, London. The conclusion arrived at from evidence given by fifty-three representative witnesses was, that customs giving compensation for purchased food for stock, and certain kinds of manure, for draining, chalking, and working of the soil—the result of all which outlays is to effect an improvement of the soil, more or less lasting, and requiring more or less time to elapse before the increased productiveness, thereby obtained, reimburses the expenditure incurred—existed only in few districts of counties, and that only in these few localities, unless by direct stipulation with the landlord (who generally made the incoming tenant pay), was compensation for any improvements made to the outgoing tenant, however short the time between their completion and the termination of the occupancy. The evidence on custom proves how much revision of customs is required. 'Where best known and most practised, they scarcely ever in reality possess a stronger power than that of a custom by courtesy. Any man can resist or defy them, if he thinks fit to do so, for the expensive, tardy, and problematical process required to enforce his obedience is, from motives of prudence, rarely resorted to. Even then the custom comes into court to claim the support of an authority it has only indirectly, if ever, actually received, and which will require very clearly-traced proof of its existence to extend to such a usage any recognition at all. The custom of the county, in short, has been allowed, or rather been received as law, from the want of any law upon the matter; and vague and uncertain in its origin, it naturally becomes equally so in its action. Twenty-seven years have made no notable alteration in the matter of tenant right. We gather this from the reports and summary schedules of an inquiry into the A. C. of England and Wales (1875). Customs are very capriciously distributed, the greater portion of England still remaining without compensation to the tenant for capital expended in improvements. A map of England in which the prevalence of such custom should be represented by a distinguishing colour would exhibit a series of most irregularly-shaped and unequally-distributed patches—the most conspicuous feature being the very small proportion of the surface of England enjoying any custom of adequate compensation even for purchased feeding stuffs. (See Reports of Committee of Central and Associated Chambers of Agriculture on Unexhausted Improvements.) The universal opinion of farmers is that a general principle of compensation should be legalised.

Agricultural Education. It is impossible to give a definition to this heading. It embraces all the sciences (theoretically); practically it means that those who till the soil should be well acquainted with natural laws. If seed is sown at a wrong season, or when the soil is not in proper tilth, then the farmer is not educated. There is a great want of general education among farmers—too much haphazard work. Farmers do not, as a rule, keep farm-books; their accounts extend from week to week in the corn-markets, and then, the items on their note-books struck through, the transactions are at an end. The Cirencester College, established in 1845 entirely through the efforts of Mr E. Holland, has been very successful. The terms are £50 for non-residents, and £130 for resident pupils. After a good general education, in which geology and meteorology should be combined, the best education for a young farmer is that which is to be obtained by going over the farm of a skilled farmer. There are many gentlemen who take in youths as pupils, and the three Lothians of Scotland are the best for those who desire knowledge of arable and stock husbandry.

Agricultural Implements and Machinery. For centuries attempts have been made to improve the implements intended for the cultivation of the soil—to supersede the mere wooden forked stick of Eastern countries, and the scarcely more efficacious instruments that prevailed from that time down to a comparatively recent date. It is curious, in looking over old books on agriculture, to notice what prejudice existed against the use of iron and wheel ploughs—a prejudice which in Kent especially is not entirely removed from the minds of the farmers with regard to tillage instruments of iron construction, and

which is only being gradually overcome in Scotland with regard to wheels on ploughs. Lord Kames, in *The Gentleman Farmer*, expresses his dislike to two-wheeled ploughs thus: 'All complicated ploughs are baubles; and this as much as any. The pivots of such wheels are always going wrong; and besides they are choked with earth, as to increase the friction instead of diminishing it.' A good authority on husbandry, as it was practised in 1765, the Rev. Adam Dickson of Dunse, agrees in this opinion; and in 1795 Mr Robertson, an eminent farmer at Granton, whose *Agricultural Survey of Midlothian* is an exhaustive one, writes still more contemptuously about the wheels on the earliest instruments employed in tillage. He says of a plough made by Mr Small (an implement still in use, and of proved utility), that it 'is now universal over Scotland, and perhaps were it better known in England, it might come to displace the complicated ploughs with wheels and other trumpery with which agriculture there is at present encumbered; as it is not apt to be put out of order, but simple in the construction, and effective in operation, it is adapted to almost every situation.' The swing-plough and the wheel alike are gradually giving way to the double-furrow and the three-furrow ploughs, and even these are being superseded by steam-tackle on moderately-sized farms where too many land-fast stones do not present almost insuperable obstacles in the expensive process of removal.

There have been many abortive efforts in perfecting machines for cultivating the soil, for sowing seed, and for drilling; for rolling, for hoeing after the blades attain a certain height, for reaping and gathering when the cereal crop reaches fruition, and for digging potatoes without manual labour. But the supremacy of mechanical adaptation over either manual or horse labour, or both combined, may be dated from the 'Great Exhibition' of 1851. Long and wearisome was the struggle to get reaping-machines introduced into the United Kingdom, although to Scotland belongs the honour of having first invented these great savers of human toil. To a Forfarshire clergyman, the Rev. Patrick Bell, is undoubtedly due the invention for cutting corn. In 1826 he tried the machine in the Carse of Gowrie, but it was then only in a rudimentary state, and the principle practically lay dormant until the 'World's Great Fair.' Then came M'Cormack and Hussey, Americans, who 'bettered' the instruction given, and whose first machine was tried in 1851, upon a field on Mr Mechi's farm at Tiptree. Since that time these machines have been multiplied by hundreds and by thousands, and the names of the makers are legion. So also are they in grass-mowers, in combined machines, in harrows, in rollers, in chaff-cutters, in root-pulpers, in hay-makers, in root-washers, in cake-breakers, in corn-grinders, in winnowers, in threshing-machines, drills, &c. Steam cultivation is rapidly growing in favour. It was at first looked upon askance; it is now recognised as the most profitable mode of cultivation where fences are not too frequently interposed. Fences, forest-trees, and small holdings are the great obstacles to steam in the field. Winnowers were introduced in 1710 from Holland by a Scotchman; Jethro Tull, in 1740, was first to make the drill known, and a long time it took to make it popular. The horse-hoe was also his invention (the inventor of both died in Fleet Prison). Andrew Meikle introduced a threshing-mill into Scotland in 1786, and mills, after his construction, became very general in East and Mid Lothian shortly after. This machine was propelled by horse, and was a very primitive affair. In 1788 a dibbling-machine was invented, and the first agricultural portable steam-engine was set in motion by Davies of Birmingham in 1841. Since that time marvellous strides have been made in the manufacture and improvement of all the implements and machinery mentioned. The character and description of the more important machines will be found under their particular headings.

Agricultural Societies. Associations for the promotion of agriculture have existed from about the commencement of the 18th c., but they can scarcely be said to have done much to forward the improvements in agriculture in this country before 1777, when the Bath and West of England Agricultural Society was established for advancing the cause of agriculture, and combining with this object the encouragement of the fine arts. For nearly 100 years the history of this society has been one of almost uninterrupted prosperity. It holds its annual exhibition of stock, poultry, roots, seeds, and implements in various parts of the kingdom, its operations ranging from Plymouth to Guildford, Croy-

don, and Windsor, the last three within easy distance of London. It is extremely popular wherever it goes, much more so than the Highland and Agricultural Society of Scotland or the Royal Agricultural Society of England. Venetian flags and festoons of evergreens wreath the whole streets on its progress from the triumphal arch at entrance of the town it visits to the place where its tents are pitched. The prizes offered are very liberal, and accordingly attract a large number of exhibitors of horses, cattle, sheep, and pigs from all parts of the kingdom. It publishes annually a volume of *Transactions* containing many valuable essays on practical and scientific questions specially relating to agriculture. Next in date and importance comes the Highland and Agricultural Society of Scotland, by far the wealthiest in the United Kingdom, its accumulated funds being about £60,000. This society was instituted in 1784, its object being then limited to the improving of waste districts in the Highlands of Scotland. It was not long, however, before it extended its area of usefulness, and it now embraces the whole of Scotland, holding its annual shows of stock and implements in rotation in Edinburgh, Glasgow, Stirling, Perth, Aberdeen, Kelso, Inverness, Dumfries, and Berwick. Besides the encouragement which this society bestows upon exhibitors at its own displays, it likewise gives prizes and medals to local exhibitions, and stimulates proper cultivation of the soil by awards to efficient ploughmen in most of the agricultural districts of Scotland. Further, it takes an interest in agricultural education generally, but perhaps not to the extent that its means would enable it to do; in the veterinary art, especially in the Edinburgh Veterinary College; and it also supplies its members with cheap analyses of feeding stuffs and manures by chemists whom it salaries. In 1793 the Board of Agriculture was established through the instrumentality of Sir John Sinclair, which had for its secretary the famous Arthur Young. In 1798 the Smithfield Club was formed for the purpose of improving the breed of stock through the agency of fat animals, which have to combine symmetry with well-bred early maturity, and good quality of flesh. The Royal Society of England, now the first in the world, did not come into existence until 1838, and the Royal Agricultural Society of Ireland until three years afterwards. Like the Highland, these two combine exhibitions of stock with the publication of instructive essays upon husbandry. Among the more prominent provincial societies the Yorkshire Society may be mentioned, which is not excelled, if even equalled, by any, in its exhibition of that grand breed of animals, the shorthorn. The London Farmers' Club was established in 1845, the first of its kind; and since then similar institutions have become common in all central rural districts. These societies have effected vast changes for the better in the form and quality of cattle and sheep, causing production of more palatable beef and mutton, heavier fleeces of wool, and, as a rule, at much less cost in proportion to the prices realised. The Benevolent Association, founded in 1860, mainly through the efforts of Mr Mechi, ought not to be forgotten in this list. It has proved of great benefit to aged and decayed farmers, and to widows and offspring of agriculturists.

Agrirentum (Gr. *Akragas*), now *Girgenti*, on the S.W. coast of Sicily, founded by a colony from Gela (582 B.C.), was at one time so flourishing that Diodorus estimated the population at 200,000. The Carthaginians destroyed it B.C. 405. After the Punic wars it became subject to Rome. The Saracens held it from 825 to 1086 A.D. The modern town, of which the population is about 15,000, has a cathedral and a public seminary. It also contains magnificent and extensive ruins of the ancient A., the best preserved of which are the Temple of Concord and that of Juno Lucina, both Doric.

Agrimonia (Agrimony), a genus of herbaceous plants belonging to the order *Rosacea*. *A. Eupatoria*, or common agrimony, is a frequent roadside plant in Britain. Its foliage is astringent and slightly aromatic, and is occasionally used as an 'herb tea.' It contains tannin, and has been recommended as a tonic. Hemp A. is *Eupatorium cannabinum*.

Agrippa, **Cornelius Heinrich**, a celebrated writer, philosopher, and physician of the 16th c., was born at Cologne in 1486. First a teacher of theology in Franche Comté, and then at Cologne, where he also dabbled in alchemy, he next distinguished himself as a soldier, and was knighted by Maximilian I. Not content with such honour, he took the degree-

the Council of Constance, and was accessory to the death of Huss. Though holding strongly the superiority of councils to popes, and in favour of ecclesiastical reform, he was thoroughly opposed to the tenets of Huss. He died at Avignon in 1420 or 1425. A. was surnamed the Hammer of Heretics and the Eagle of the Doctors of France. His works have been often printed. See *Dinaux's P. d'Ailly* (Cambrai, 1824), and Tschackert's *Peter von Ailli* (Gotha, 1877), in which his ecclesiastical position is clearly set forth.

Ailsa Craig, a huge rock near the entrance to the Firth of Clyde, and about 10 miles from the coast of Ayrshire. It is a mass of trap, 2 miles in circumference, rising in a cone shape 1114 feet above the sea. It slopes abruptly, and on the N. W. strikes perpendicularly to the sea from a height of 300 feet. It is haunted by myriads of solan geese and other sea-fowl.

Ain, a frontier dep. in the E. of France, occupies an angle formed by the confluence of the Rhone and the Saône, and is bounded on the N. by the dep. of Jura. Where it adjoins Switzerland, in the N. and E., A. is hilly and fertile, but a vast malarious swamp covers most of the portion W. of the river A. The chief town is Bourg (q. v.) Area, 2258 sq. miles; pop. (1872) 363,290.—The river A. rises in the Jura, and joins the Rhone 18 miles above Lyon, after a course of nearly 100 miles.

Ainmüller, Maximilian Emanuel, the restorer of the art of painting on glass, was born at Munich, February 14, 1807, and died there, December 8, 1870. When very young he showed an extraordinary talent for decorative art, to which he ultimately wholly applied himself. Many cathedrals and churches possess monuments of his skill, e.g., the windows of the cathedrals of Ratisbon, Augsburg, and Cologne. But the most elaborate and comprehensive of all his undertakings was the restoration of the windows of Glasgow Cathedral (1864). His talent in architectural oil-painting is also well known, and specimens are to be seen in many galleries and churches in Europe.

Ainsworth, Robert, born near Manchester in 1660, and educated at Bolton, was the author of a once popular Latin dictionary, commenced in 1714, and published in 1736, which is now superseded by more accurate and scientific works. A. was long engaged in teaching, first at Bolton, and afterwards at Bethnal Green, London. He composed some Latin poems, and several treatises now forgotten. He died 4th April 1743.

Ainsworth, William Francis, geologist and traveller, born at Exeter in 1807, studied medicine in Edinburgh and geology in France, accompanied the Euphrates expedition as physician and geologist in 1835, and in 1838 was again sent to Asia Minor by the Geographical Society and the Society for the Diffusion of Christian Knowledge, to explore the river Halyr, and visit the Christians in Kurdistan. His chief works are, *Researches in Assyria* (1841), *Travels in the Track of the Ten Thousand Greeks*, and *Cilicia and its Governors*.

Ainsworth, William Harrison, a well-known English novelist who was born in 1805. His works are numerous, and were once popular. None exhibit high talent, and those in which he selects highwaymen and housebreakers for his heroes are positively pernicious. The following may be named: *Rookwood* (1834), *Crichton* (1836), *Jack Sheppard* (1839), *Old St Paul's*, *The Tower of London*, *The Lancashire Witches*, *The Court of St James*, and *The Good Old Times* (1873), *Merrie England* (1874), and *The Leaguer of Lathom* (1876). He edited *Bentley's Miscellany* for some years, and in 1842 started *Ainsworth's Magazine*.

Ain-Tab, or **Antab**, a town of Asiatic Turkey, vilayet of Syria, 60 miles N.N.E. of Aleppo, on a tributary of the Euphrates. It is a place of military importance, is well built, has abundance of water, and carries on a considerable trade in hides, leather, cotton, wool, wax, wheat, and rice. The castle of A. is a picturesque object. Pop. 20,000.

Air, or **Asben**, a country of Central Africa, lies between the kingdoms of Tebu and Songhai, towards the S. of the Sahara, extending from about 17° to 19° N. lat., and from 8° to 9° E. long. It is naturally fertile, but wretchedly cultivated, most of the food being imported. The sultan, who is merely nominal ruler, resides at Agades, the capital (q. v.) The population is chiefly divided into the Kel-owi, Kel-geres, and Itisan tribes.

The word *air* denotes 'settled people'; many of the tribes, however, are nomadic.

Air is the name applied to the atmosphere of the earth, but was formerly a general term for all those ætiform fluids which are now included under the name of gas. The properties of A. will be found under **AERODYNAMICS**, **ATMOSPHERE**, **BAROMETER**, &c.

Air-Beds are mattresses made of vulcanised india-rubber divided into separate compartments, each of which is provided with an air-valve. When inflated, they form very light, clean, and comfortable couches. They are chiefly used for invalids. Air-cushions are similarly prepared.

Air-Bladder, Swimming-Bladder, or 'Sound.' A sac or membranous bag found in many fishes, and generally lying beneath the spine. It varies greatly in shape, being in some (as in the perch) a simple closed cylindrical sac, or divided (as in *Cyprinidae*). It may consist of a single sac, or be divided internally into cells, as seen in the *Lepidosiren*, or mud-fish. In some cases (e.g., perch, &c.) it is entirely closed; whilst in others (carp, herring) it communicates with the throat by a tube, the *ductus pneumaticus*, which is the homologue of the windpipe, just as the A. itself is the homologue of the lungs of higher vertebrates. It is never used for breathing, however, in any fishes except in the *Lepidosiren* (q. v.) The A. contains gases of various kinds; oxygen abounding in that of marine fishes, and nitrogen in that of fresh-water forms. Its use in fishes is to alter their specific gravity, and to enable them thus to rise or sink in the water by expanding or compressing the contained gas. Some fishes (e.g., flat-fishes, sharks, skates, mackerel, &c.) want this structure.

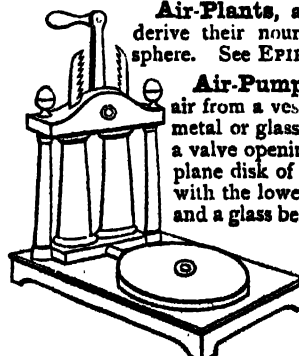
Air-Cells, or Air-Sacs, and Air-Tubes. The term applied to certain sacs or cavities in the interior of the bodies of birds, formed by folds of the lining membranes of the viscera, and into which air from the lungs is sent. The obvious function of these air-cells is to render the body of the bird light for flying, whilst the distribution of air also tends to increase the temperature of the body. The air-cells of the lungs (see **LUNGS**) are the minute cavities or sacs in which the bronchial tubes terminate, and on the walls of which the capillary networks of blood-vessels ramify, and so subject the venous blood to the action of the oxygen contained in the air within the air-cells. Air-tubes, or *tracheæ*, constitute the respiratory organs of insects.

Air-Cells or Air-Cavities, in plants, consist either of circumscribed spaces surrounded by cells, or of lacunæ formed by the disappearance of the septa between a number of contiguous cells, as in hemlock and pith of walnut. They are large in aquatic plants, and enable them to float.

Air-Engine. See **CALORIC ENGINE**.

Air-Gun is an instrument for projecting bullets by means of compressed air, which is condensed in a chamber by a condensing syringe in the stock of the gun. This chamber opens by a valve in connection with the trigger, just behind where the bullet is lodged. In some forms the condensing syringe is distinct from the stock, thus affording more room for the air. The advantages of the A. over the rifle in producing no noise, smoke, or disagreeable odours, and in being less expensive, are more than counterbalanced by its much smaller range.

Air-Plants, a name applied to plants which derive their nourishment from the moist atmosphere. See **EPHYPHYTES**.



Air-Pump.

Air-Pump is an instrument for removing air from a vessel, and consists essentially of a metal or glass cylinder in which a piston with a valve opening outwards is fitted air-tight; a plane disk of metal (usually brass) connected with the lower end of the cylinder by a tube; and a glass bell-like vessel called the receiver, which is placed upon the disk, and in which it is intended to produce the vacuum. At each stroke of the piston, the quantity of air in the receiver and connecting-tube is lessened and by repeating the operation again and again, a tolerably

perfect vacuum may be formed. A mercury gauge is usually present, in order to ascertain at once the pressure of the air inside the receiver.

Aird, Thomas, poet, born at Bowden, Roxburghshire, Aug. 28, 1802, and educated at Edinburgh University. He contributed to *Blackwood's Magazine* most of those poems which were afterwards collected into a volume in 1848, and republished in 1856. The best Scottish critics praised them highly, but they have never become popular, with the exception of *The Devil's Dream*, a poem combining stern grandeur with touching pathos and beauty. In 1835 A. was appointed editor of the *Dumfriesshire Herald and Galloway Register*, an office which he held till 1863. Two prose works, *Religious Characteristics* (1827), and *The Old Bachelor* (1848), are full of quiet grace and beauty. In 1852 he edited, with a memoir, the poems of David M. Moir. A. died April 25, 1876. See *The Poetical Works of T. A.*, 5th ed., with a Memoir by the Rev. Jardine Wallace (Edinb. 1878).

Airdrie, a town in Lanarkshire, Scotland, 11 miles E. of Glasgow. Though an old town, it has only risen into importance during the present century. The cause of its sudden growth is the abundance of coal, and of the 'black-band' ironstone peculiar to the district. A. has two stations on the N. British Railway. It unites with Falkirk in returning a member to Parliament. There is considerable cotton-weaving, paper-making, and engineering works. Pop. (1871) 15,671.

Airy, Sir George Biddell, K.C.B., F.R.S., D.C.L., &c., Astronomer Royal, was born June 27, 1801, at Alnwick, in Northumberland. He finished his education at Cambridge, and was Senior Wrangler in 1823. As Plumian Professor in 1828, he superintended the Cambridge Observatory, and succeeded Mr Pond at Greenwich in 1835 as Astronomer Royal. His *Astronomical Observations* were published at Cambridge in 9 vols., 1829-38. A. has made many improvements in scientific instruments, and conducted many interesting investigations, such as the determination of the density of the earth by pendulum experiments at the Harton coal-pits, the effect of a ship's magnetism on the compass, &c. He has also written many valuable scientific treatises, such as the article on *Gravitation* in the *Penny Cyclopædia*; *Trigonometry*, for the *Encyclopædia Metropolitana*; treatises on *Sound* (1869), *Light*, *Magnetism* (1870), *Errors of Observation* (1861), and *Mathematical Tracts*, besides numerous papers in the *Philosophical Transactions*, the *Cambridge Transactions*, the *Athenæum*, &c.

Aisle (Fr. *aile*, Lat. *ala*, a wing) is a term in architecture properly applied to those parts of a church which lie between the outside walls and the columns or pillars which flank the nave. It is also applied to the lateral divisions of the choir and transept. Many of the Continental churches have double aisles, Cologne has three.

Aisne, a dep. of France, in the basin of the Seine, and extending to the Belgian frontier. It contains rich pasture and arable land, and has considerable manufactures of cotton fabrics, soap, glass, and leather. The chief town is Laon (q. v.) Area, 2830 sq. miles. Pop. (1872) 552,439.—The river A. rises in the dep. of Meuse, and flows first N.W. and then W. past Soissons, till it joins the river Oise above Compiègne, after a course of 150 miles.

Aix (*Aque Gratiæ*, *Allobrogum*), a town of Savoy, in a pleasant valley, 823 feet above the sea-level. It lies picturesquely near Lake Bourget, and as early as the Roman empire was celebrated for its two hot springs, which still attract above 2000 visitors annually. Among various Roman remains are an Ionic temple, a vaporarium, and the arch of Pomponius.

Aix (the *Aqua Sextia* of the Romans), a town in the S. of France, in the dep. of the Bouches-du-Rhône. It possesses a court of justice, an academy, and a public library of 100,000 volumes and 1100 MSS. Its graceful architecture, sheltered situation, and hot springs, make A. a pleasant and fashionable resort. It can boast of an unbroken municipal life since its foundation by the Consul Sextius (120 B.C.), and has buildings now devoted to the service of the Christian religion that were first used as pagan temples. Under the Counts of Provence, in the middle ages, it was long the centre of the Troubadour literature. There is an active trade, chiefly in olive-oil, cotton, wine, and leather. Pop. (1872) 18,905.

Aix-la-Chapelle (Ger. *Aachen*), a town of Rhenish Prussia, and capital of a district of the same name, lies in the rich valley of the Wurm, 20 miles S.E. of Cologne. It derives its French name from its famous springs (*aix*) and from a chapel built there by King Pepin before 765 A.D. Charlemagne made it his capital, rebuilt its chapel, and died here in 814 A.D. The chapel was destroyed by the Normans, but restored in 983 by Otto III., who opened a tomb inscribed 'Carolo Magno,' and discovered the body of Charlemagne in almost perfect preservation. The emperor, sceptre in hand, and dressed in state robes, was seated on a marble chair, with a copy of the Gospel on his knee. The tomb was reverently built up, but was twice subsequently reopened, by Frederick I. and II., and finally in 1215 the remains were transferred to a costly chest, still preserved in the sacristy of the cathedral. Till 1558 the marble chair of Charlemagne was used as a throne when German emperors were being crowned. The cathedral of A. is built in the Byzantine style, and is rich in relics, the display of which once in seven years brings many thousands of devotees to the city. What remains of the imperial palace is now included in the town-house, which contains a splendid hall, where thirty-seven emperors and eleven empresses of Germany have been crowned, and which has lately been ornamented with frescoes from Charlemagne's life by Rethel. Long a decayed town of great historical interest, A. is fast becoming an important industrial centre. It is a station on the Belgian-Rhenish Railway; contains a Polytechnic school, erected in 1870; and is noted for its manufactures, chiefly of machinery, bells, chemicals, woollen fabrics, and cigars. The French captured A. in 1792; it was retaken by the Austrians in 1793; but by the treaties concluded at Campo Formio and Lunéville it was ceded to France (1797), and made capital of the dep. of Roer; finally, in 1815, it became a Prussian city. Pop. (1871) 74,238. See Quix, *Geschichte der Stadt A.* (History of A., 2 vols. 1841.)

The *mineral springs* of A., known as early as the time of Charlemagne, attract many thousands of visitors to the city annually. There are six hot and two cold springs: the former are sulphurous, with a temperature from 111° to 136° F., and are very effective in the cure of gout, rheumatism, and cutaneous diseases; the latter are chalybeate.

The first *treaty of peace* concluded at A. (1668) settled the succession to the Spanish Netherlands, and resulted from the triple alliance between England, Holland, and Sweden against France. It allowed Louis XIV. to retain the fortresses of Charleroi, Lille, &c., on returning Franche Comté to Spain. The second peace, concluded 1748, terminated the Austrian War of Succession. The *Congress of A.* in 1818 was attended by the sovereigns of Austria, Russia, and Prussia, assisted by ministers from England and France. It resulted in the withdrawal from France of the army of occupation, 150,000 strong, and in the formation of a 'Holy Alliance' (q. v.) of the great powers.

Ajaccio, the chief town of Corsica, on the W. coast of the island, mainly notable as the birthplace of Napoleon. It has considerable anchovy and pearl fisheries, and some trade in wine, olive-oil, and fruit. Pop. (1872) 13,580.

Aja'n, an unexplored tract of the E. coast of Africa, from Cape Guardafui to the equator, inhabited by Somauli tribes.

Ajax. Of the Greek heroes at the siege of Troy there were two of this name. 1. A. the Less, son of Oileus, King of the Locrians, brave and fleet of foot, next to Achilles. On his return from Troy, Athena caused him to be drowned because he had violated the sanctuary of the goddess in the seizure of Cassandra. 2. A. the Greater, son of Telamon, King of Salamis, excelled all the Greeks in stature, and in beauty was second only to Achilles. On the death of that hero, A. and Ulysses contended for his armour, and A. being defeated killed himself.

Ajmeer (*Ajmir*), the capital of a province of the same name in Rajputana, India, under British protection, is built on the slope of a hill. The principal object of interest is the tomb of a Mahomedan saint, to which the emperor Akbar made a celebrated pilgrimage. The military cantonments are at Nasirabad. The A. college, founded in 1868, is attended by 400 pupils. Pop. (1876) 26,569. The *province* of A. has an area of 2711 sq. miles, and a pop. (1876) of 396,889. It is hilly and barren, and was without means of communication until the opening of

the Rajputana railway. The inhabitants mostly belong to the wild tribes of Bheels. The administration of the province was made over to the British in 1818.

Ajuruo'oa, a town of Brazil, province of Minas Geraes, about 100 miles N.W. of Rio Janeiro. It lies at the base of the Sierra Mantiqueira, near the sources of the Parana, and is the centre of a district which produces coffee, sugar, tobacco, millet, and mandioc. Pop. of town and district, 12,000.

Aka, the New Zealand name for *Metrosideros scandens*, a plant belonging to the natural order *Myrtaceæ*. Its wood is called New Zealand Lignum Vitæ, on account of its hardness.

Ak'bar ('the Great'), properly Jalâl-ad-dîn-Mahomed Akbar, the greatest of the Mogul emperors, and one of the most enlightened monarchs the world ever saw, was the seventh in descent from Timur-Leng, and the grandson of Baber, who first established the Mogul ascendancy in Hindustan. He was born at Umarnot, in the desert of Sind, 14th October 1542, during the exile of his father Humâyûn, who had been driven from his throne by an Afghan prince named Sher Shah. His childhood was passed in perils or captivity; but in 1555, when A. was only thirteen years of age, Humâyûn crossed the Indus, defeated the Afghans in a memorable campaign, and remounted the throne of Baber. He died a few months afterwards. A., who succeeded him, was fortunate in having for his guardian and minister Bairâm Khân, a friend of his father's, who on the plains of Panipat (5th November 1556) thoroughly crushed a formidable Afghan insurrection. Bairâm Khân, however, was proud and tyrannical, and when A. reached the age of eighteen he relieved him of office. Stung with rage the fierce minister rushed into rebellion, but was soon beaten and captured. A. behaved very magnanimously to his old guardian, who was, however, soon after assassinated on his way to Mecca.

Henceforth the career of A. in war and peace is alike splendid. He never met defeat in the field, he was never baffled by a fortress. The earlier years of his reign were partly spent in suppressing disorder or mutiny among his enemies, which he did with such promptitude, skill, valour, and wisdom, that at the age of twenty-five (1567) he was thoroughly master of his own dominions. He then turned his attention to external conquest, reduced Rajpootana in spite of the heroic struggles of the native princes, conquered Ahmedabad, Surat, and Guzerat (1573); invaded and established his power in Bengal (1575-77), which had become the home of the vanquished Afghans; made himself master of Cashmere, 'the paradise of India' (1586); after two campaigns, confirmed his authority in the basin of the Indus and Western Afghanistan (1587-92); and finally, passing the Vindhya Mountains, compelled several of the kingdoms of the Deccan to acknowledge his supremacy (1595-1601). Thus the empire of A., which on his accession to the throne comprised only the Punjab and the provinces of Delhi and Agra, four years before his death formed an immense quadrilateral, more than a thousand miles in length from E. to W.

His activity and intelligence in furthering the material prosperity of his subjects was no less remarkable. He constructed roads, introduced a uniform system of weights and measures, insisted on a prompt and faithful administration of justice, and established an admirable financial system, of which a complete account is given in the *Ain-i-Akbari* of Abû'l Fazl 'Allami, court historian and friend of A. The monarch also surrounded himself with men eminent not only in war and government, but in arts and letters. He was likewise singularly tolerant and philosophical in matters of faith. At an early age he doubted the infallibility of the Koran, in spite of his name, Jalâl-ad-dîn ('Glory of the Faith'), and began to dream of a religion which would not be dependent on the character or pretensions of its founders. The result was a pure deism, belief in a God infinitely powerful, just, and good. On this basis he hoped to unite Mussulman and Hindu, and throughout his whole reign he sought to bring about a closer relation in thought and feeling between these two. The memory of his humane ambition long survived him, and he is still remembered in the East as a 'benefactor of the human species.' He died in 1605, after a reign of fifty years. A.'s history has been written by three of his contemporaries—Nizam-ud-Dîn, Abd-ul-Kâdir, and Abû'l-Fazl, whose *Akbar-Nâma* is a great work, though written with Oriental servility. But the greatest and most enduring monument of A.'s reign is the *Ain-*

i-Akbari, translated into English by Gladwin (3 vols., Calcutta, 1786), and again in part by Blochmann (Calcutta, 1874).

Akbarpur ('city of Akbar'), a town of India, N.W. Provinces, district of Cawnpore, 28 miles W. of Cawnpore. Pop. 6330.

Akee', the name given to the fruit of *Blighia sapida*, one of the *Sapindaceæ*, a small tree, native of Guinea, but which has been introduced into the W. Indies and S. America, where it is now widely spread. The fruit is about the size of a goose's egg. It splits into three parts when ripe, exhibiting three black seeds immersed in a white cellular substance called the *ari'*, which is the eatable part of the fruit, and which possesses a slightly acid taste. The seeds yield a fatty oil.

A'kenside, Mark, poet and physician, was born at Newcastle-on-Tyne, November 9, 1721. He commenced his medical studies at Edinburgh in 1739, and continued them at Leyden, where he graduated M.D., 1744. In the latter year he published his *Pleasures of the Imagination*, a poem suggested by Addison's essays on the same subject in the *Spectator*. He was engaged in rewriting this work, and had half completed his task, when his death took place in London, June 23, 1770. A second edition of the *Pleasures of the Imagination*, with odes and miscellaneous poems, was published by Mr Dyson in 1772. A.'s poetry, though it lacks abiding human interest, evinces high command of the rhetorical capabilities of blank verse; and the study of his chief work in its original and in its amended and improved form is one of the most useful exercises in English composition which the language affords. The best edition of A. is that by Dyce, in the Aldine edition of the 'British Poets,' to which is prefixed an excellent memoir.

Akhalzi'kh, or **Aki'ska**, a town of Russian Armenia, on a tributary of the Kur, about 90 miles W. of Tiflis, in a valley of the Keldir Mountains. The mosque of A. had one of the most valuable libraries in the East, but when the Russians took possession of the place in 1828, they carried off its treasures to St Petersburg. A. carries on trade with the ports on the Black Sea, in the produce of the neighbourhood, maize, wheat, barley, flax, grapes, figs, and honey. Pop. (1867) 15,977.

Ak-Hissar, the *Thyatira* of Scripture, a town of Asia Minor, province of Anatolia, 52 miles N.E. of Smyrna, abounding in fragmentary remains of antiquity. Pop. 10,000.

Akhla't, or **Ardi'sh**, a fortified town of Asiatic Turkey, vilayet of Van, on the N.W. shore of Lake Van. Pop. 6000. At a short distance from it lay the old city of A., the capital of the Armenian kings, which was plundered by the conqueror Jalâl-ad-dîn in 1228, and utterly destroyed by an earthquake eighteen years later.

Akhtyr'ka, a town of European Russia, government of Khar'kov, 58 miles N.W. of Kharkov, on a petty tributary of the Dnieper, has some manufactures, but is chiefly noted for its great yearly fair. Pop. 17,500.

Ak'jermann, or **Akkermann** ('white town'), a fortified town in Bessarabia, Russia, at the point where the Dniester enters the Black Sea. It has a capital harbour, and in the vicinity are important salt-pits. By the treaty of A. (1826) between Russia and Turkey, the latter consented to the separate government of Moldavia and Wallachia, and granted to Russia free intercourse with all the states of the Porte, and the right of navigation of the Black Sea and the Strait of Constantinople. In 1828 Russia took up arms to enforce the fulfilment of these terms, and the war ended in the peace of Adrianople (q. v.)

Ak'ron, a town of Ohio, United States, 36 miles S. of Cleveland, at the junction of the Ohio and Erie Canal with the Pennsylvania and Ohio Canal, and a station on the Cleveland and Zanesville Railway. It has woollen factories, flour-mills, and manufactures of agricultural implements. Pop. (1870) 10,000.

Ak-Shehr, the 'white city,' and the *Philomelion* of the ancient Greeks, a town of Asiatic Turkey, pashalic of Karamania, 5 miles S. of a salt lake of the same name, is famed for its manufactures of carpets. Pop. about 6000.

Aksu', a town of Eastern Turkestan, at the foot of the Thian-shan range, 260 miles N.E. of Yarkand, on the river

Aksu, a tributary of the Tarim. On the decay of the empire of Genghis Khan, it became the capital of an independent state, but was almost destroyed by an earthquake in 1716, and an inundation in the present century. It was a Chinese garrison town till 1867, when it surrendered to Yakub Beg. A. has manufactures of cotton cloth, saddlery, &c., and is an entrepôt for the caravan trade between Russia and China. Pop. from 6000 to 20,000.

Akyab, formerly a native fishing village called Tsit-daw-way, at the mouth of the Kaladan river, is situated on the right bank of the river, and is now a flourishing seaport and the principal town of the province of Arakan, British Burma. It possesses one of the finest harbours in India, being effectually sheltered by a double reef of rocks. A lighthouse stands on the outer reef on Savage Island, and another screw-pile lighthouse has been lately erected near the south end of Oyster Reef, a dangerous ledge of rocks running parallel to the coast 16 miles westward. A. has no direct import trade, and rice is almost the only article of export. The first cargo shipped to Europe was in 1847, when the first European houses settled there, and so rapid was its progress that in 1855 over 160,000 tons were exported. In 1874 the exports were 162,744 tons. Seven large rice-mills on the European principle have during the last few years been erected here. A. is daily visited by a cool sea-breeze, and is styled the Brighton of the Bay of Bengal. A. has a fixed population of over 21,000, composed of Mughls, Bengalees, and Madrasses. But as many as from 9000 to 10,000 Bengalees come from Chittagong to work during the busy season from January to June.

Alabama, one of the southern states of the United States of America, bounded N. by Tennessee, E. by Georgia, S. by Florida and the Gulf of Mexico, and W. by the Mississippi. It lies between 30° 10' and 35° N. lat., and between 85° and 88° 30' W. long. It contains an area of 50,722 sq. miles, or 32,462,080 acres, is 336 miles in extreme length, and varies in breadth from 150 to 200 miles. A. would form a rectangle were it not that Florida occupies the greater part of the coast-line, leaving to A. only about 60 miles on the Gulf of Mexico. The Alleghany Mountains terminate on the N.E. part of the state in a series of low hills. The surface gradually declines from the N. to the S., till near the coast it becomes level. There are three bays in its short coast-line, of which Mobile Bay is the chief. The rivers, which are numerous, follow the general southward deflection of the surface. The three largest are the Tennessee, the Tombigbee, and the A., the last two of which unite near the coast to form the Mobile. Though A. reaches to nearly within 7° of the torrid zone the thermometer is seldom above 90°. In 1850-60 the average annual temperature was 66° 14", that of summer 79°, that of winter 52° 43". Snow does not lie long, and the rivers never freeze. The climate of the elevated country is very salubrious, but the lowlands near the rivers are unhealthy.

The hilly regions of the N. afford excellent pasturage, while the valleys interspersed are exceedingly rich in soil. The undulating prairie, which forms the central part of the state, is also remarkably fertile, and, though the soil in the S. is often sandy, the river bottoms are all wonderfully productive. Oaks, hickories, chestnuts, poplars, and mulberries cover the N. and centre of the state, while in the S. are the cypress, loblolly, and pine. A. is mainly an agricultural state, and includes among its principal products cotton, Indian corn, wheat, rye, buckwheat, oats, barley, potatoes, tobacco, hay, indigo, sugar, rice, and wool. The total value of the agricultural products in 1870 was 67,522,335 dollars. The yield of cotton was inferior only to that of Mississippi and Georgia. Among the wild animals are deer, bears, wolves, foxes, turkeys, geese, and ducks. The minerals, in which A. is very rich, include iron, coal, lead, manganese, ochres, marble, and a little gold. There are also numerous salt, sulphur, and chalybeate springs. The sulphur water of Blount's springs attracts large numbers of visitors. According to the state reports for 1870, the value of manufactured articles in that year was 13,040,644 dollars, in the production of which 8248 hands were employed. In 1872 there were 1602 miles of railway. In 1870 A. possessed 10 colleges and 2812 public schools. The state university, a very handsome building, is situated at Tuscaloosa. Among religious denominations, those of the Baptists and Methodists embrace by far the largest number of adherents.

The government resembles that of the other states. The governor is elected for two years, the 33 members of the senate for four years, and the 100 members of the house of representatives for two years—all by the people. A. is divided into 63 counties. The largest town and chief seat of commerce is Mobile; the seat of government is Montgomery.

The population of the state in 1870 was 996,992, of whom 475,510 were coloured.

History—The name A., which means 'here we rest,' is taken from the language of the aborigines. The first Europeans who visited A. were the adventurers under De Soto, who fought their way through the aboriginal tribes on their march to the Mississippi in 1541. The first settlement was made by the French at Mobile Bay in 1702. Nine years afterwards the city of Mobile was founded. The peace of 1763 transferred A. to the British crown, and it was incorporated first with Georgia and then with the Mississippi territory in 1802. In 1819 it became an independent member of the United States of America. A. was one of the slave and seceding states, but in 1868, after the war of secession, it acceded to the demands of Congress, and was restored to its place in the Union.

Alabama, *The*, a vessel built at Birkenhead in 1862, by Messrs Laird & Sons, for the Confederate Government. Her career was frightfully destructive, but far from honourable. In the opinion of Americans she was essentially a piratical craft, and it is certain that she was forced to deal with her captures precisely as a pirate does, against whom every port is closed, i.e., she first plundered and then burnt them. As her devastations gave rise to the 'Alabama Question,' and ultimately cost Great Britain a heavy sum of money, it may be important to note the circumstances under which she was built and her subsequent fortunes. When the civil war in the United States broke out in 1861, the Northern or Union Government rapidly effected a complete blockade of the Southern ports. Now and again an adventurous ship managed to run the blockade, but on the whole the Confederates were powerless at sea. They neither received much help nor were able to do much harm. They could not carry out their original idea of equipping a fleet of swift cruisers to make havoc of the Northern merchant shipping. After three or four months of civil war, however, the *Sumter*, a small steamer hitherto employed in the Gulf trade, and commanded by Captain Raphael Semmes, formerly of the United States navy, and a man of strong and resolute character, ran the blockade of *New Orleans* (30th June 1861), and quickly filled with consternation the merchants of the North, who saw their entire commerce imperilled by the incessant attacks of a solitary cruiser. Before the close of the year she had become unseaworthy, and was laid up at Gibraltar, after having captured or destroyed eighteen vessels. Her success, however, only showed the Confederates what might be achieved by a ship thoroughly equipped for such work, and engagements were accordingly entered into with Messrs Laird & Sons, Birkenhead, for the construction of a screw steam-sloop. Everything was arranged with such caution and secrecy that this ship was nearly finished before the United States officials suspected its purpose and destination. The greatest care was taken to avoid any infringement of public law. Nothing was done except what was perfectly lawful in the case of any 'belligerent,' and the Union Government had been compelled by the necessities of war to grant belligerent rights to the South. At length the United States minister demanded that the suspicious vessel should be detained. The Crown lawyers at first hesitated to recommend this course, but subsequently advised it. It was too late! 'No. 290' (the name of the new ship, from her number in the list of steam-ships built by the firm) was gone! No one can doubt that there was a great deal of illicit knowledge and underhand activity in connection with her hasty departure from Birkenhead, and the conduct of Messrs Laird & Sons, viewed in regard to its results, cannot be commended as either prudent or patriotic. The new cruiser was a wooden ship of 1040 tons register, barque-rigged, with two engines of 350 horse-power each, pierced for 12 guns, besides being able to carry two heavy pivot-guns amidships, and cost in all nearly £52,000. At Terceira, one of the Azores, she was 'equipped,' i.e., she received guns, stores, and coals from another vessel, the *Agrippina* of London. Captain Semmes then stepped on board, and on the 24th of August 1862 produced his commission, named the vessel the *A.*, hoisted the Confederate flag, and prepared for her deadly

work. Before the 16th of September she had destroyed more than her own cost, and for nearly two years after she was the terror of Northern merchantmen in every sea. In all, she captured sixty-five vessels, and destroyed property estimated at 4,000,000 dollars. The shipping trade of the United States was partially paralysed, and had to be carried on in foreign 'bottoms.' Public indignation was great, not only against Semmes, but against the British Government, which had allowed 'No. 290' to escape. Swift-sailing cruisers scoured the seas in search of the 'pirate,' who was at length forced, partly from want of stores, to take refuge in the port of Cherbourg, on the coast of Normandy, 11th June 1864. A few days later, the United States steamer *Kearsage*, commanded by Captain Winslow, also arrived at Cherbourg, and was soon after recklessly challenged by the 'pirate' ship. It is supposed that Semmes was ignorant of the great superiority of the *Kearsage* to the *A.* in equipment; but at any rate, on the 19th of June, the fight took place outside the port, in presence of thousands of spectators, and in less than an hour the terrible *A.* was sunk. Semmes and others were picked up by an English yacht, the *Derhound*, and at once placed within neutral jurisdiction. See *The Cruise of the Alabama and the Sumter*, compiled from the papers of Captain Semmes, and also the work written by Captain Semmes himself, entitled *My Adventures Afloat* (2 vols. 1868).

Not many months after the *A.* had commenced her destructive career, Mr Seward, in his capacity of Secretary of State, informed the British Government that the United States held themselves entitled to damages for the injuries done to American commerce by a vessel fitted out for war in a British port, and would claim them in due time. The idea took strong hold of the American mind, and at length Great Britain was induced to submit to arbitration the question of her culpability in regard to the escape of the *A.* A congress met at Geneva, 17th December 1871, consisting of representatives of Great Britain and the United States, and of three members appointed by the King of Italy, the President of the Swiss Confederation, and the Emperor of Brazil. The decision was given 15th September 1872. It was adverse to Great Britain, which was ordered to pay to the United States the sum of £3,229,166, 13s. 4d.

Alabaster. See GYPSUM.

Alagoas, a maritime province of Brazil, bounded N. and W. by the province of Pernambuco, E. by the Atlantic, and S. by the navigable river San Francisco. A flat belt of rich alluvial soil runs parallel with the coast, abounding in lagunes (*lagoas*), from which the name of *A.* is derived. The productions are chiefly sugar-cane, cotton, mandioc, maize, rice, dye-woods, and timber. Area, 530 sq. miles; pop. 300,000. The capital was formerly a city of the same name, but is now Porto Calvo, a prosperous shipping town in the N.

Alais (anc. *Alatum*), a town of France, dep. of Gard, at the southern base of the Cevennes, on the left bank of the Gardon, a tributary of the Rhone, and 23 miles N.W. of Nîmes, with which it is connected by railway. The neighbourhood is rich in coal and iron, and also produces lead and manganese. Besides large iron foundries, the town has manufactures of silks, gloves, glass, earthenware, machinery, &c. In the time of the Huguenots *A.* embraced the Protestant side, and suffered in consequence. After the revocation of the Edict of Nantes it was erected into a bishopric for the conversion of Protestants. Pop. (1872) 15,384.

Alajuela, a town of Costa Rica, Central America, 23 miles W.N.W. of Cartago. Pop. about 12,000, many of whom are largely engaged in the cultivation of the sugar-cane.

Alamanni, Luigi, an Italian poet of noble extraction, born at Florence 1495. For a time he stood high in the favour of Leo X., but had twice to leave his country for political offences, and finally settled as a diplomatist at the French court. He died at Amboise in 1556. His chief works are (1) a collection of eclogues, hymns, satires, elegies, fables, &c.; (2) *Opere Toscane*; (3) *La Coltivazione*, a didactic poem in blank verse, considered the author's finest work; (4) *Girome di Cortese*, and *La Avarchide*, both epic poems; (5) a pleasant comedy in verse, entitled *Flora*;—all remarkable for their clearness and purity of style. *A.* is probably the poet who introduced blank verse into Italian poetry.

Alamos, Los (*is.*, The Poplars), or **Real-de-los Alamos**, a town of Mexico, province of Sonora, on the right bank of the Mayo, about 50 miles from the Gulf of California, is the chief town of a district noted for its silver mines. Pop. 10,000.

Åland Islands, a group of about 200 rocks and islands, 80 of which are inhabited, situated at the entrance to the Gulf of Bothnia, and named from the chief island. The population consists of Swedish sailors, seal-hunters, and fishermen, and amounts to 16,000, of whom, however, 11,000 belong to Åland itself. The archipelago was ceded by Sweden to Russia, 1809, and in the reign of Nicholas I. the island of Bomarsund was strongly fortified. During the Crimean war this fortress was destroyed by an Anglo-French force under Sir Charles Napier and Baraguay d'Hilliers.

Alangium, a small genus of trees belonging to the natural order *Alangiaceæ*. The fruit of some of the species is fleshy and edible, but rather alimy. Their roots are aromatic, and their timber is durable and of a beautiful colour. They are natives of India.

Alarcon Y Mendoza, Juan Ruiz de, a Spanish dramatist, born at Tasco in Mexico towards the end of the 16th c., was a jurisconsult by profession. In 1622 he is mentioned as Reporter of the royal council of the Indies, and must have then been in Spain. He failed to conciliate contemporary writers, probably from having formed too just an estimate of his and their powers, and was therefore subjected to much vituperation and ridicule. He did not even enjoy the credit of his own works, some of the best of them being assigned to other poets. There is as yet no complete edition of them, and as they are scattered through miscellaneous collections, he is less known and appreciated than he deserves to be. A number of his *Comedias* were published in two parts, the first at Madrid in 1628, and the second at Barcelona in 1634; a complete edition was carefully prepared by Hartzenbusch (Madrid, 1848-52). He ranks next after Calderon and Lope de Vega, and the works of no poet of his nation could with more justice be selected as a model for a national drama. His plots are ingenious, and his style chaste and vigorous. He is simple, unaffected, and possesses rare elevation of moral feeling. He excelled in the heroic drama, in character-comedies, and in comedies of intrigue. He died in 1639.

Alaric I. (the name is a form of *Athalaric*, 'noble ruler,' comp. Eng. *Ethelric*), the famous Visigothic warrior, born about 376 A.D., first emerges into history in 394, when Theodosius gave him the command of his Gothic auxiliaries. The discords that followed the death of Theodosius inflamed his ambition. In 396 he invaded and pillaged Greece, from which, when pressed by Stilicho (397), he made a masterly retreat to Illyria, of which the scared Arcadius made him governor. In 400 he invaded Italy, but sustained a defeat from Stilicho at Pollentia (403), followed by a treaty, in terms of which *A.* transferred his services from Arcadius to Honorius. But Honorius having failed to pay him 4000 pounds of gold, *A.* made a second invasion of Italy, memorable for three sieges of Rome. The first (408) was bought off, but the second (409) resulted in the surrender of the city, and the substitution of Attalus for Honorius. The incapacity of Attalus induced *A.* to restore Honorius, who having sanctioned a treacherous attack on the troops of *A.*, Rome was besieged for the third time, taken 24th August 410, and sacked for six days. *A.* intended to invade Sicily and Africa, but dying at Cosenza, he was buried in the bed of the Busento, the captives who had assisted in the work being put to death. *A.* was naturally generous, and it was owing to him that the splendid edifices of Greece and Rome suffered so little damage during his invasions. The faith which he had learned from Arian teachers was not without effect on his conduct. The most lasting effect of his inroads on the Western Empire was the establishment of the Visigothic Empire in Spain by the warriors whom he left behind him. See Simonis' *Kritische Untersuchungen über die Geschichte A.'s* (Gött. 1858).

Alaric II., eighth king of the Visigoths, succeeded his father in 484 A.D. He preferred peace to war, and, though an Arian, granted privileges to the Catholics. Clovis, King of the Franks, coveted his possessions to the W. of the Loire, and on the pretence that *A.* was an Arian, broke the peace. Theo-

Ala, King of the Ostro Goths, and father-in-law of A., tried conciliatory measures, but in vain. In a battle at Vouillé, near Poitiers, the army of A. was defeated, and himself slain (507). The *Breviarium Alaricianum*, a selection from the imperial decrees and the writings of Roman jurists, called also *Lex Romana* and *Corpus Theodosii*, is a proof of his anxiety for law and order. It is a work of great importance in the history of Roman legislation, and contains documents not to be found elsewhere. An edition was published at Basel in 1528.

Ala'ria, a genus of sea-weeds (*Alga*), embracing few species, confined to the colder regions of the Atlantic and Pacific. One species is very common on British shores, viz., *A. esculenta*, which is known in Scotland under the names of badderlocks, henware, and murlins. It is regarded as the best of all the esculent *Alga* when eaten raw. Badderlocks is believed to be a corruption of Balderlocks, or the locks of Balder, a Scandinavian deity.

Alarm, in a military sense, means a warning of imminent danger given to a camp or garrison. When the enemy has effected or is supposed to be designing a surprise, a drum is beat or a gun fired, and soldiers know to hasten to a rendezvous called the alarm-post.

Ala-Shehr ('the variegated city'), a town of Asiatic Turkey, pashalic of Anatolia, at the foot of Mount Imolus, 75 miles E. of Smyrna, in a fertile district on the caravan route between Smyrna and the interior, and carries on a considerable trade in corn, cotton, and tobacco. A. is the ancient *Philadelphus*, so called because enlarged by Attalus II. Philadelphus, and was the seat of one of the seven churches of Asia. It was the last place in Asia Minor that submitted to the Ottoman Turks. Many remains of Greek antiquity are still to be found. Pop. 8000.

Alas'ka, a peninsula on the N.W. coast of N. America, whose natural continuation, the long chain of the Aleutian Isles, stretches towards Kamtchatka. Its connection with America was not known till Captain Cook explored the region in search of an Arctic passage. A volcanic mountain range, subject to frequent eruptions, extends through the entire length of the peninsula, which abounds with mooses, reindeer, bears, and seals. The name A. is now given to the whole territory once known as Russian America, which was ceded by Russia, 1867, to the United States for 5,000,000 dollars. Area, 577,390; pop. (1870), whites, 461; Indians, estimated at about 70,000.

Alatern'us, the name of a common evergreen shrub (*Rhamnus alaternus*), native of the S. of Europe. Its roots and bark have been used in dyeing.

Alau'si, a town of S. America, republic of Ecuador, and province of Chimborazo, on a small stream of the same name, which flows into the Gulf of Guayaquil. It stands 7980 feet above the sea. The neighbourhood very abundantly produces grain, sugar, and fruits. Pop. 6000.

Ala'va, Don Miguel Ricardo de, a distinguished general of Spain, born at Vittoria 1771. In the war of independence he sided with the French till the fortunes of Joseph began to decline; he then joined the national party, and was appointed aide-de-camp to Wellington, who soon advanced him to the rank of general of brigade. After the restoration of Ferdinand VII. he was appointed ambassador to the Hague. When the revolution of 1820 broke out, he was returned as a deputy to the Cortes by the province of Alava, and became a leader among the Exaltados, voting for the suspension of royal authority. The restoration of Ferdinand in 1823 drove him to England, where he remained till the regency of Maria Christina. He then became Spanish ambassador to London in 1834, and to Paris in 1835. A. gave in his resignation in 1837, after the insurrection of La Granja, retired to France, and died at Baréges in 1843.

Al'ba, or **Alva**, Ferdinand Alvarez de Toledo, Duke of, a notable Spanish general and statesman, was born in 1508. Though his education as a soldier began very early, for he was present at the battle of Pavia in 1525, it was long before he showed himself to possess military talent of the highest order. The victory, however, which Charles V. gained at Mühlberg in 1547 over Johann Friedrich, Elector of Saxony, was considered to be mainly due to the efforts of A. He served under

the emperor in the unsuccessful campaign in France to recover the fortresses of Metz, Toul, and Verdun, which Henry II. had seized, and several times defeated the combined armies of the King of France and Pope Paul IV. in Italy in 1555. After the abdication of Charles V. in 1556, the French army having retreated, he held the States of the Church in complete subjection, but the new Spanish monarch, Philip II., ordered him to restore his conquests and to make peace with the Pope. In 1559 he visited the French court, where as proxy for his sovereign he married Elisabeth, daughter of Henry II. When the Netherlands rose against the tyrannical and bigoted rule of Spain, A. was sent (1567) with absolute power and a large army to quell the insurrection. Having defeated the Princes Louis and William of Orange, and driven the latter into Germany, he made a triumphant entry into Brussels, 22d December 1568. There is probably no other record of such atrocious cruelty and oppression as that of A.'s rule in the Netherlands. He established what was called the 'Bloody Council.' All were condemned by this tribunal who were even suspected of disaffection to the Spanish rule, or whose wealth was a cause of jealousy, and their property confiscated. Even the dead were not exempt from trial. A grateful Pope conferred on the successful warrior a consecrated hat and sword as 'Defender of the Catholic Faith,' an honour which no one had hitherto received under the rank of a monarch. The contest for freedom was meanwhile maintained in Holland and in Zealand, the insurgents ultimately succeeding in destroying the Spanish fleet. Philip was at last convinced of the impossibility of effecting union by force and oppression, and A. was at his own desire recalled, after having, in the course of six years, according to his boast, executed 18,000 men. His reception at Madrid on his return to Spain was highly flattering; but in a short time a court intrigue of one of his sons, whom he assisted to escape after detection, caused his disgrace and banishment. For two years he lived at his castle of Uzeda. War then broke out between Spain and Portugal, and A. was again put at the head of the Spanish forces. Portugal was swiftly conquered and plundered by a rapacious soldiery. The treasures of the capital were seized by the leader himself. Philip was dissatisfied, but dread of a revolt and the determined bearing of the duke, prevented him from giving practical effect to his displeasure. A. died 12th January 1582, aged seventy-four. See *The Rise of the Dutch Republic*, by J. L. Motley.

Alba (anc. *Alba Pompeia*), a town in the N. of Italy, province of Cuneo, on the river Tanaro, 31 miles S.E. of Turin. Its finest buildings are the cathedral (1486), the Franciscan church, the episcopal palace, and that of the counts of Castelletto, rich in treasures of antiquity. It is also noted for its promenades, lined with splendid acacias. A. carries on trade in wine, truffles, cattle, and cheese.

Alba Longa (the 'long white' city), one of the most ancient cities of Latium, on the eastern side of the Alban Lake, was built, according to Roman legend, by Ascanius, and was the parent city of Rome. It was certainly the metropolis or sacred city of the Latins. Tullus Hostilius destroyed it, and removed the inhabitants to Rome.

Albacete, a town in the S.E. of Spain, capital of the province of the same name, on a broad plateau rich in corn-fields, 82 miles S.W. of Valencia, and a station on the Madrid and Alicante Railway. It is well built, and has considerable manufactures of steel goods. Pop. 15,150.

Alban, St., surnamed the *proto-martyr* of England, flourished, according to the Church legend, in the 3d c., and suffered martyrdom in 285 A.D., during the persecution of Diocletian. Bede, who wrote in the 8th c., is the first to record the story of his death, but he surrounds it with such grotesquely miraculous accessories that one is tempted to doubt the whole narrative. A.'s name, however, is known to the hagiographers of the 6th c. His anniversary is celebrated on the 22d of June.

Alba'ni, Francesco, an Italian painter, born at Bologna 1578, studied under the Caracci, and won a great reputation both by his religious and mythological pictures. His altar-pieces are numerous, but his finest production is a representation of the seasons. A. died at Bologna 1660.

Alba'nia, a province of European Turkey, bounded E. by Macedonia and Thessaly, N. by Montenegro, Servia, and Bos-

nia, W. by the Ionian and Adriatic Seas, and S. by Greece. Upper or Northern Albania corresponds to ancient Illyria, and Lower or Southern Albania to Epirus. It is now divided into the Vilayets of Janina and Prisen (including Scutari since Oct. 1874). The mountain ranges are the Bora-dagh and Pindus, and the valleys between are swamps. The highlands of Epirus, densely wooded, stretch to the sea. The most remarkable river is the Glykus (Acheron), which for a portion of its course is subterranean; and Janina is one of the principal lakes. In the N., though the conditions are favourable, agriculture is not actively prosecuted; some maize and barley and rice in the moister valleys being the only cereals. In Epirus, however, vines and olives, mulberry and other fruit trees are cultivated, and even fair crops of wheat, maize, and rice are produced. Enterprise alone is wanted to put agriculture on a hopeful footing. The Albanians, like most half-civilised mountaineers, prefer semi-warlike to industrial pursuits. The country is the abode of anarchy, neighbouring villages, and even the different divisions of the same village, being often at deadly feud. After the death of Scanderbeg many of the Albanians, who were all previously Christians, became Mohammedans. The Suliotes, inhabiting the steep valleys of the Acheron, distinguished themselves by their determined resistance to Ali Pasha. The chief ports are Durazzo and Avlona; the chief inland towns, Scutari and Arta. Area, 34,150 sq. miles; pop. 2,051,721.

Albano, a town on Lake Albano, 18 miles from Rome, a favourite retreat of the more opulent Romans. Alba Longa stood on the opposite side of the lake. Near A. are the remains of an amphitheatre. A fine wine is grown in the neighbourhood. Pop. 5000.—The **ALBAN LAKE** (Lago di Castello), about 1000 feet above the level of the sea, and 1000 feet deep, with a circumference of 6 miles, occupies the basin of an extinct volcano. Roman legend says that in 390 B.C., during the siege of Veii, the Romans let off the water by means of a tunnel driven through the banks of lava that girdle it, which still remains. The Alban Mount (Monte Cavo), 3000 feet high, is on the E. bank.

Albans, St., an ancient borough in the county of Hertford, 21 miles N.W. of London. It lies on the slope and summit of a hill at the foot of which flows the Ver, on the other side of which is the site of the ancient Roman town of Verulamium, an important place during the whole period of Roman occupation. Here St Alban (q. v.) suffered martyrdom, and 500 years later, Offa, King of Mercia, founded a Benedictine abbey in his memory, which became famous during the middle ages, its abbot obtaining from Pope Adrian IV. the right of precedence over all English abbots. This abbey was the origin of the modern town, which dates from the 10th c. During the wars of the Roses A. was the scene of two battles, in the first of which (1455) the Yorkists were victorious, and in the second (1461) defeated. Not a few great Englishmen were born here in past times: Nicholas Breakespeare, afterwards Pope Adrian IV. (12th c.), Alexander Neckham (13th c.), Sir John Mandeville (14th c.), Sir F. Pemberton and Sir J. King, both great lawyers (17th c.), &c.

The chief industries of A. are the manufacture of straw-plait, silk fabrics, Berlin wool, canvas, &c. There are also foundries, rope-walks, breweries, and in the neighbourhood numerous corn-mills, &c. Pop. (1871) 8293.

Albany, or **Albainn**, the original Celtic name probably of the whole of Britain, certainly of the Highlands of Scotland. The root of the word is *alp* or *alb*, which in Gaelic and Kymric denotes a hill or craggy rock, so that A. means 'the land of hills.' Philologists, however, believe that the Celtic term is connected with the Lat. *albus*, 'white;' and that 'Albion,' the oldest name of Britain (see Aristotle's *Treatise on the World*), was perhaps so called because its 'white' cliffs were visible to the natives of Gaul. As a titular name A. was first used when the brother of King Robert III. was made Duke of A. in 1398. The last who legally bore it was Frederick, second son of George III., but Prince Charles Stuart assumed in exile the title of 'Count A.'

Albany, the capital of New York, U. S., on the W. bank of the navigable river Hudson, 145 miles N. of New York city. It was founded by the Dutch in 1623, and passed into English possession in 1664, when it was called A. in honour of the

Duke of York and Albany. Its city hall is a fine marble building with gilded dome, the new capitol (commenced in 1871) is a costly specimen of Renaissance architecture, and the most imposing of its sixty churches is the Catholic Cathedral of the Immaculate Conception. A. has a scientific university, instituted in 1852, a State library of 90,000 vols., a State museum of natural history, &c. It has manufactures of tobacco, iron, and ropes, and a great trade in timber; but, in spite of its central position, has not materially advanced in prosperity for some years. Pop. (1875) 86,000.

Albany, Louise-Marie-Caroline, Countess of, daughter of the Prince of Stolberg Gern, born in 1753, was married to Prince Charles-Edward, the Young Pretender, in 1772. In 1780 she left her husband, who ill-used her, and retired to a convent. After his death in 1788 she settled at Florence, where she died 29th January 1824. She was privately married to Alfieri (q. v.), and their remains rest in the same tomb in the church of Santa Croce, at Florence.

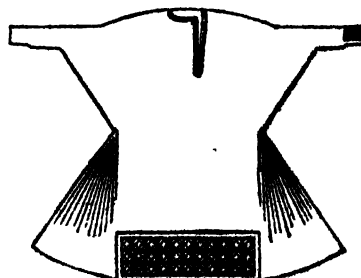
Albatross (*Diomedea*). These birds are included in the order of natatorial or swimming birds, and form a genus belonging to the division *Procellariidae* or Petrel family. The upper mandible or bill is strongly arched or curved, the lower mandible being abrupt or truncate at its point. The anterior part of both mandibles is separated from the posterior or basal portion. The nostrils exist in the form of tubular structures, which open on the surface of the upper mandible. The hinder toe is of rudimentary nature—this toe in the gulls being well developed—and, as in swimming birds generally, the three front and developed toes are webbed. These birds resemble the other members of the petrel tribe in that they are of free oceanic habits, spending the greater part of their existence on the wing, and flying abroad in the most stormy weather, and far out at sea. The nest is of rudimentary construction, the eggs frequently being deposited on the ground. The A. is the largest member of the tribe, the wings frequently measuring fifteen feet from tip to tip. The familiar species is the *Diomedea exulans*, or wandering A.; the habitat of this form being to the S. of the Cape of Good Hope. A northern species, the *D. fuliginosa*, inhabits the N. Pacific and Antarctic regions. The colour of the former is a general white, greyish on the upper parts, with black feathers on the tail and back. The latter species is an almost uniform brown.



Albatross.

Albay, a town in the southern part of the island of Luzon, Philippine Islands, about 2 miles from the bay of A., capital of a province of the same name, is well built, but subject to earthquakes, and carries on considerable trade. Pop. 13,000.

Albe, or **Alb** (Lat. *albus*, white), the *alba tunica*, *alba linea*, *camisia*, interior tunic of ecclesiastical writers, is the long white garment worn under the chasuble or tunic by priests in the Roman Catholic Church while engaged in divine service. The Anglican surplice is essentially the same thing.



Alb.

Alberoni, Giulio, Cardinal, a subtle, ambitious, and unscrupulous minister of state, was born at Firenzuola on the 31st of May 1664. Though but the son of a gardener, his abilities were so great that in 1711 he was thought worthy to accompany the Duc de Vendôme to Spain in the capacity of his secretary. In 1713 the Duke of Parma employed him as his agent at Madrid, where he quickly rose into favour at court,

and brought about the marriage of Philip V. with Elisabeth Farnese. He was made successively bishop, prime minister, and cardinal. To gratify the ambition of the queen he invaded Sardinia in violation of the treaty of Utrecht, and afterwards Sicily. This unlooked-for audacity made England, France, and the emperor unite against Spain in 1719. As Holland subsequently joined them, the league was known as the *Quadruple Alliance*. But A. was unmoved. To irritate England he favoured the Pretender; he claimed for Philip V. the regency of France; and to annoy the emperor he corresponded with the sultan. But the misfortunes which he brought upon the country by land and sea provoked general indignation, and a court conspiracy drove him from Spain Dec. 20, 1720. He wandered about Italy in disguise, and was for some time imprisoned in the territory of Genoa, but after the death of Clement, Innocent III. reinstated him in his dignities. He died at Piacenza June 26, 1752, at the age of eighty-eight, entirely forgotten by the world. See Rousset, *Vie d'A.* (Hague, 1719), and Bersani, *Storia del Cardinale Giulio A.* (Piacenza, 1802).

Al'bert, Francis-Augustus-Charles-Emmanuel, Prince of Saxe-Coburg-Gotha, late Consort of Queen Victoria, was the second son of Ernest, Duke of Saxe-Coburg-Gotha. He was born August 26, 1819, and educated at Bonn University. In 1840 he became the husband of the Queen of England. On his marriage he was naturalised as a British subject, received the title of Royal Highness, and then and afterwards he had conferred upon him many other honours and dignities. In 1857 his status was definitely settled by his being declared the 'Prince Consort.' The name of Prince A. will ever be remembered as that of a true friend of progress and the people. He was an earnest promoter of science and art, and was the first to suggest the International Exhibition of 1851. The manner in which he filled his somewhat anomalous position as the Queen's Consort was marked by the greatest sagacity and tact. His death, 14th December 1861, caused the most profound grief throughout the nation. See *The Early Years of the Prince Consort*, by Lieut.-General Grey (1867), and *Life of the Prince Consort*, by Theodore Martin (vols. i-iii. 1875-77). A collection of the speeches of Prince A. was published soon after his death.

Al'bert N'yanza, an immense lake of E. Central Africa, about 80 miles W. of the Victoria N'yanza, whose limits as yet are far from being accurately known. It is oblong-shaped, and its E. shore is overhung by high cliffs, rising in occasional peaks to from 5000 to 10,000 feet; and the N. and W. sides are bordered by the Blue Mountains, which have an altitude of over 7000 feet. The A. N. lies 2720 feet above the sea-level. It drains an equatorial mountain-range where rain falls for ten months in the year, and its water is sweet and of great depth. The Victoria branch of the Nile, here called the Somerset River, after leaving Victoria N'yanza, enters the A. N. at its northern extremity. The lake was known to Speke and Grant as the Little Luta Nzige, and was first visited by Sir Samuel White Baker (q.v.) in 1864. The latest travellers who have explored the lake are Stanley and Colonel Mason (1877).

Alber'tus Mag'nus. See ALBRECHT OF BOLLSTÄDT.

Al'bi, an old city of France, capital of the dep. of Tarn. It stands on a height above the river Tarn, and has a fine Gothic cathedral, and a public library of 12,000 volumes. A. gave name to the Albigenes, and suffered severely during their persecution. The manufactures are chiefly table-linen, cotton and woollen goods, and leather; and a considerable trade is carried on in fruit and wine. Pop. (1872) 13,698.

Albigen'es, a common name applied to various religious sects that sprang into existence in the S. of France during the 12th c. in opposition to the Romish Church. Albigeois, in Languedoc, was the district where they were most numerous; hence their name. The murder of a papal legate, hated by the people for his cruelties, afforded a pretext to Pope Innocent III. for a crusade against the A. in 1209. This expedition was in reality, however, meant to deprive of his lands a noted tolerant of the 'heretics,' Count Raymond VI. of Toulouse. The papal forces took Beziers, and it is said massacred 40,000 of the inhabitants. The war of persecution thus fiercely begun raged in the territories of Raymond and his allies for many years. After the death of hundreds of thousands on both sides,

a treaty of peace (1229) was forced on Raymond VII., by which he gave two-thirds of his estates to Louis IX., paid large sums to the Church, and made his son-in-law, the brother of the king, heir of his remaining possessions. Soon afterwards he died, and Toulouse reverted to the French crown. When peace was declared, the newly-instituted order of Dominicans began the work of proselytising among the scattered sects. Most of the A. who had escaped the sword were afterwards condemned by the bloody tribunals of the Inquisition. Before the end of the 13th c. the name disappears. See Flauriel, *Croisade contre les Albigeois* (Par. 1838); Faber, *Inquiry into the History and Theology of the Vallenses and Albigenes* (Lond. 1838); and Hahn, *Geschichte der Ketzer im Mittelalter* (Stuttg. 1845).

Alb'ino, the term applied to such members of dark-skinned races (e.g., negroes) as exhibit a want of the full development of normal colouring-matter or pigment in the skin. This condition is occasionally known as *leucosis*. The pigment is deposited in the deeper layer of the outer skin or epidermis, and hence in albinos the skin appears of an unusually pale tint. The eye, in which colour is also deposited, exhibits a similar want of pigment, the iris appearing of markedly red or congested appearance. The hair also participates in this colourless condition. The absence of pigment in the eye renders the sight of albinos weak in diffuse or ordinary daylight. The causes of albinism are among the undetermined points connected with developmental and reproductive processes and conditions. This condition occurs also in lower animals—the ferret being thus supposed to be an A. polecat.

Al'bion. See ALBANY or ALBAINN.

Al'boin, the founder of the Lombard kingdom of Italy, was a descendant of the Amals, and succeeded his father in 561 A.D. as ruler of Pannonia, and other countries in the valley of the Danube. Five years later he destroyed the nation of the Gepidæ, slew their king Kunimund, and married his daughter Rosamunda in 567. A. invaded Italy at the instigation of Narses, the Byzantine conqueror of Italy, who had been recalled to Constantinople by the Empress Theodora 'to spin with the other eunuchs,' and who swore that 'he would spin her a thread that would serve her all her life.' The whole valley of the Po was swiftly conquered. A. was, however, murdered in 573 by one of his own soldiers, whom Rosamunda had hired to avenge the outrage A. had inflicted on her at a public banquet, in compelling her to drink wine from a goblet made of her father's skull.

Albornoz, Gilles, or **Egidius Alvarez Carrillo**, a warlike Spanish prelate, born at Cuenca about the beginning of the 14th c. Alfonso XI. of Castile appointed him, while still a youth, Archbishop of Toledo. In the wars against the Moors he saved the life of the king. Incurring the enmity of Peter the Cruel, he repaired to Avignon, and was made a cardinal by Clement VI. Innocent VII. sent him to Rome as cardinal-legate, and Urban V., whose dominions he had recovered for him, appointed him legate at Bologna. He died at Viterbo in 1367. A. left behind him a work on the constitution of the Church of Rome, which was not published till 1473.

Albox', a town in the S. of Spain, province of Almeria, formerly part of Granada, 42 miles N.E. of the seaport of Almeria, on the river A., a small tributary of the Almanzora. It has manufactures of blankets, linens, hempen articles, and corn and oil mills. Pop. 7430.

Al'brecht, last Grand-Master of the Teutonic Order, and first Duke of Prussia, was born in 1490. In 1511 he was chosen Grand-Master of the Teutonic Order, which held dominion over that part of present Prussia which borders on the Baltic, and which alone bore the name of Prussia at that time. He refused to take the oath of feudal allegiance claimed by Sigismund, King of Poland, as due from the Teutonic Order, and became involved in war with that monarch in 1520. In 1525, by the advice of Luther, whose cause he had espoused, he arranged a peace at Cracow, in accordance with which the duchy of Prussia was secured to him and his descendants as a fief of Poland, the rights of the order being thus laid aside. A. spent the remainder of his life in attending to the welfare of his duchy. In 1543 he founded the since famous University of Königsberg, but his later years were troubled and unhappy, owing to the bitter disputes, political and ecclesiastical, of the age. He died in 1568.

Albrecht, Archbishop of Magdeburg, Elector of Mainz, and cardinal of the Church, better known as A. of Brandenburg, the younger son of Johann of Brandenburg, surnamed *Cicero Germanicus*, was born in 1489, became Archbishop of Magdeburg in 1513, and Elector of Mainz in 1514. He has a place in history mainly because he was the man that appointed the monk Tetzel in 1516 to 'preach the sale of indulgences,' and thereby precipitated the Reformation. But he also deserves to be remembered, though not admired, as the first German prince who admitted the Jesuits into his dominions. All through life A. was 'dreadfully short of money' (Carlyle's *Hist. of Frederick the Great*, vol. i. b. iii. ch. iv.). It was this which compelled him at an early date to employ Tetzel, and late in life (1541) he found himself driven to grant religious liberty to his subjects in order to get his debts, which amounted to half a million florins, paid. A. died at Aschaffenburg in 1545.

Albrecht I., Duke of Austria, and afterwards Emperor of Germany, born in 1248, was the son of Rudolph of Hapsburg, the founder of the Austrian imperial dynasty. On the death of his father he seized upon the insignia of empire without consulting the Diet, but afterwards considered it prudent to take the oath of allegiance to Adolphus of Nassau, chosen emperor by the electors. In 1298, however, he defeated and slew Adolphus, who had become very unpopular, and was crowned emperor in his stead. Pope Boniface VIII., who at first refused to acknowledge A. as emperor, was afterwards induced to enter into amicable relations with him, by the successful boldness of his resistance to the papal authority. A. was also engaged in war with Holland, Hungary, and Bohemia, but had no success. The revolt of the Forest Cantons in Switzerland is the most memorable incident in his career. While on his march to crush the Foresters he was assassinated in 1308 by his nephew, Duke John of Swabia, whose possessions he had usurped. His daughter Agnes, Queen of Hungary, exacted a most dreadful vengeance for his death.

Albrecht, Archduke of Austria, born in 1559, was a son of the Emperor Maximilian II. Devoting himself at first to the Church, he was made a cardinal (1577), and Archbishop of Toledo (1584). He was appointed governor of Portugal (1594-96), and of the Netherlands (1596). Two years later he married Isabella, daughter of Philip II. of Spain, receiving the Netherlands as her dowry. After several campaigns against the Dutch he made a truce with them in 1609, and died at Brussels in 1621.

Albrecht the Bear, founder of the Markgrafdom of Brandenburg, and one of the ablest German princes of his time, was the son of Otho, Count of Ballenstadt and Aschersleben, and was born in the year 1106. In 1125 Lothar II. conferred on him, in regard for his steady loyalty, the district of Lausitz, to be held as a fief of the German empire. In 1134 he was made Markgraf of Northern Saxony, which he extended by conquering some of the lands of Prebislav, King of the Wends, and in 1142 he obtained the government of Swabia. Up to this point the great aim of A.'s ambition was to get possession of the dukedom of Saxony, to which he had the best claim. As he could not, however, succeed in making it good, he now renewed his old struggle with his Wendish neighbours, wrested from them the Middle Mark and the New Mark, and so founded the state of Brandenburg. In his last Wendish war (1157) he almost exterminated that unfortunate people, and then brought colonists from the Rhine, both Dutch and Flemings, to fill their places on the Elbe, the Havel, and the Spree. After a pilgrimage to Palestine, from which he returned in 1159, the remainder of his life was spent in thoroughly Germanising his new possessions. He died at Ballenstadt in 1170. See Heinemann's *A. der Bär* (Darmst. 1864).

Albrecht, Count of Bollstädt, better known as Albertus Magnus, born at Lauingen, in Swabia, in 1193 or 1205. He studied at Padua, joined the Dominicans (1222), taught in Ratisbon, Strasburg, and Cologne, and then removed to Paris (1245) with his pupil Thomas Aquinas. Here, though forbidden by the Church, he expounded Aristotle. In 1260 he became Bishop of Ratisbon, but soon resigned his see, and retired to a convent at Cologne, where he died in 1280. A.'s influence during his life was immense, and all kinds of honours, scholastic and ecclesiastical, were conferred upon him. His works, consisting to a large extent of commentaries on Aristotle, fill 21 large folio

volumes. His knowledge of chemistry and mechanics is wonderful for the time in which he lived. He is generally regarded rather as a diligent student than an original thinker, but there is an able vindication of his genius in the *Nouvelle Biographie Générale*, which merits consideration.

Albuera, a small village in the province of Estremadura, Spain, celebrated as the scene of a battle, 16th May 1811, between the French under Marshal Soult, and the Anglo-Spanish army under General Beresford. The result was a brilliant victory for the allies; but on both sides the loss was severe.

Album, among the Romans, was the name originally given to a tablet of some 'white' (Lat. *albus*) material on which was written anything of a public nature; e.g. (according to Cicero), the *Annales Maximi* of the College of Pontiffs; also the edicts of prætors, the rules relating to actions and interdicts. By-and-by it came to signify a list of the members of any public body. Tacitus speaks of an *album senatorium*, and Suetonius of an *album judicum*. This was also its meaning in the middle ages, when we read of albums of saints, soldiers, gymnasia, and universities. It is now popularly used both in France, Germany, and England to denote collections of poetry, engravings, autographs, plants, &c., done up into the form of a book.

Aluma'zar, properly Abumashar Djafar Ibn-Mohammed, an Arabian astronomer, born at Balkh A.D. 805-806. He destined himself for the law, but late in life commenced to study mathematics, and to practise judicial astrology. Hebelot calls him *le prince des astronomes de son temps*. He died 885. His two best works are *Khitabul-Mudakkhal ila Ahkami-n-Nجوم* ('Book of the Introduction to the Science of the Stars'), translated into Latin and printed at Augsburg, 1489; Venice, 1506; and *Khitabul-Kironat fi Ahkami-n-Nجوم* ('Book of Conjunction on the Science of the Stars'), translated into Latin, Augsburg, 1489; Venice, 1515. A list of fifty of his work: is preserved in the library of the Escorial.

Albumen is a highly complex chemical substance, having the formula $C_{216}H_{322}N_{51}S_2O_{98}$ (Liebig), familiarly known under the form of white of egg, of which 12 per cent. consists of pure A. It also exists in the serum of the blood, in the juice of muscle, in b. m., in pancreas, in the amniotic fluid, and generally in all the fluids and solids of the body. It is present in the solid excrements of man and of other animals, but it is not present in healthy urine. A. is coagulated by heat, and the solid condition has the same chemical composition as that in the fluid state. In the fluid state the A. is united with alkali, forming an albuminate of an alkali, such as soda or potash. Nearly all acids, but more especially nitric acid, precipitate A. from its solutions. The following varieties of A. are known to chemists: (1) Paralbumin, found in dropsical fluids, and differing from ordinary A. in not being completely precipitated by boiling; (2) metalbumin, found also in dropsical fluid, resembling generally paralbumin, but further characterised by giving no precipitate with hydrochloric acid or ferrocyanide of potassium and acetic acid. The following albuminates are recognised: Albuminate of (1) barium, (2) copper, (3) lead, (4) mercury, (5) potassium, (6) sodium, (7) silver, and (8) zinc.

A. forms a very important constituent of food. It is the pabulum in the blood from which the different animal tissues are formed. At one time supposed to be the chief agent in force-production in the body, it is now regarded as contributing more to make up for the tear and wear of the tissues—force being produced principally by the oxidation of hydrocarbonaceous substances, as fat, starch, and sugar. At the same time there can be no doubt that a certain proportion of A. introduced as food is concerned in force-production, and it is held by most physiological chemists that at least a part of it may split up in the body into a nitrogenous portion and a non-nitrogenous residue. The nitrogenous portion is partly used for the repair of the tissues, and is partly excreted in the form of urea, uric acid, &c. The non-nitrogenous residue, consisting of carbon, hydrogen, and oxygen, by oxidation, produces force, or it may become temporarily stored up in the body as fat. Whether these views be correct or not, there can be no doubt that A., either animal or vegetable, forms an important part of every diet. In certain diseases of the kidneys A. escapes into the urine. The consequence is great debility from impoverishment of the blood.

Albumen, in plants, is generally known as the perisperm. It is the matter interposed between the skin of the seed and the embryo, or, in other words, the substance deposited in the cells of the nucleus during the growth of the seed. A seed having the A. separate from the embryo is said to be *albuminous* or *perispermic*, while one having the A. incorporated with the embryo, as in the pea, is said to be *exalbuminous* or *aperispermic*.

Albumenuria is the appearance of albumen in the urine. It is a symptom, not a disease in itself. See KIDNEY, DISEASES OF.

Albuñol, a town in the S. of Spain, province of Granada, 41 miles S.E. of Granada, and about 3 miles from the Mediterranean. Its port is La Rabita. The neighbourhood produces abundantly grapes, figs, and almonds, and the inhabitants find their chief employment in preparing wines, brandy, and raisins. Pop. 6764.

Albuquerque, a town of Estremadura, Spain, 24 miles N. of Badajoz, with a castle, which is the original seat of the Dukes of A.; has some cotton and woollen manufactures, and is situated in a district of country rich in corn, wine, oil, and fruits. Pop. 7500.

Albuquerque, Afonso de, styled the Great, a Portuguese admiral, and viceroy of the Indies, the greatest of the *conquistadores* that contributed to establish the Portuguese empire in the East, belonged to the first order of Portuguese nobility, and was born at Alhanra, near Lisbon (others say at Melinda, in Africa), in 1452 or 1453. The greater part of his life was spent at court and in learned studies, mathematical and physical, but he had also in slight affairs of war given proof of high courage and sagacity. In 1503 he sailed with a fleet to India, and built a fort at Cochim, which was considered the foundation of the Portuguese supremacy in India. In 1506 he was in command in the Arabian Seas, and took the then flourishing town and island of Ormuz (q.v.), which he was soon after compelled to evacuate. He sailed for Malabar in 1508, was appointed general and commander-in-chief in India, took the wealthy town of Goa in 1510, captured the island of Malacca with immense booty, and returned to Cochim in 1512. His next enterprise was his siege of Aken (q.v.), which he failed to capture; and his last acquisition was Ormuz, which the Portuguese continued to hold down to 1622. Superseded in command by an ungrateful monarch, he died at Goa, 10th December 1515. His letter, written ten days before his death, to the Portuguese king, recounting his services and recommending his son to the royal protection, is a model of loyalty and self-respect. It was first published in its integrity in 1842 by M. da Fonseca. A. was buried at Goa, where around his grave for years the Moors and Indians went to assemble to implore from the dead victory protection against the rapacity and cruelties of his successors. He was intrepid, unscrupulous, and ambitious; but his viceroyalty was marked by a rough justice and a generous liberality which endeared his memory alike to his own soldiery and to the Indian subjects of the Portuguese empire. See *Commentaries do Grande Afonso de A.* (Lisb. 1576, 1774).

Alburnum, the name applied to the outer or sap wood of an exogenous tree. Being the younger wood, and therefore not choked up by sedimentary deposits, it is permeable to the fluids or sap of the plant.

Alca. See AUK.

Alcæus, of Mitylene, among the greatest of the Greek lyric poets, began to flourish about 611 B.C. His party, which was that of the nobles, being defeated in the civil war, he was exiled, and, unable to regain his country, he travelled in various lands, but the date or place of his death is unknown. He wrote in the Æolic dialect, and is said to have invented the Alcaic metre. Only fragments of his odes are extant, but the imitations of Horace enable us to estimate their character. While some extol the delights of love and wine, others lament the factions of his state and his own misfortunes. The most recent editions are Matthiæ, *Alcæi Mitylenæi Reliquiæ* (Leipz. 1827), and Bergk, *Poeta Lyrici Græci* (Leipz. 1843).

Alcala de Guadaira ('the castle of the Guadaira'), and the *Hienippa* ('place of many springs') of the Greeks and Carthaginians, is a town of Andalusia, Spain, 7 miles S.E. of Seville,

on a hill overlooking the Guadaira. It derives its name from a Moorish fortress, the ruins of which are still very fine. A. is a favourite summer residence on account of its healthiness. Its chief industrial prosperity is the manufacture of bread for Seville. It has no fewer than 200 flour-mills and 50 bakeries. A. also supplies Seville with water, which is conveyed to the city by means of underground canals or tunnels. Pop. 7000.

Alcala de Henares ('the castle of the river'), a town in New Castile, Spain, situated on the river Henares, 22 miles N.W. of Madrid. Pop. 5300. It was built by the Moors in 1083, near the site of the Roman *Complutum*, and became famous as the seat of the university founded by Cardinal Ximenes in the 16th c. Here was edited and printed the celebrated 'Complutensian Polyglot,' a splendid Bible in Hebrew, Greek, and Latin, the original of which is still preserved in the library. A. is supposed to be the birthplace of Cervantes.

Alcala la Real ('the castle of the king'), a town of Andalusia, Spain, on the frontiers of Granada, about 26 miles N.W. of the city of that name. It is built on a conical hill, and is nearly 3000 feet above the sea-level. A. got its name when taken from the Moors in 1340 by Alfonso XI., King of Portugal. It has some slight trade in wine and wool, but country work employs most of the inhabitants. Pop. 11,520.

Alcalde (Arabic, *al-cadi*, the judge), a term introduced by the Moors into Spain, where it signifies any magisterial or judicial office.

Alcamo, a town in the N.W. of Sicily, province of Trapani, on the highroad between Palermo and Trapani, and about 3 miles from the Gulf of Castellamare. The district is very fruitful, yet A. is not thriving, though it contains some fine churches. Pop. 19,520. Old A., which stood on a hill above the present town, is said to have been built by the Arabs in 827.

Alcázar de San Juan (anc. *Uditunum*), a town in the S. of Spain, province of Jaén, part of Old Andalusia, 22 miles S.W. of Jaén, on a feeder of the Guadalquivir. It lies in a valley surrounded by hills, has an old castle, and carries on various industries, as weaving, rope-making. Pop. 6242.

Alcañiz, a town of Spain, province of Teruel, part of Aragon, on the river Guadaloupe, 63 miles S.E. of Saragossa. It is well built, has some handsome squares, and a splendid church noted for its fine paintings and tombs. A. has silk, woollen, and linen manufactures, with corn and oil mills, and a trade in grain and cattle. Pop. 6400.

Alcantara (Arabic, the bridge), an old town in Estremadura, built by the Moors. Pop. about 4000. Its most notable building is the bridge built for Trajan 105 A.D.; but it is meanwhile a ruin. It has six arches, and is 670 feet long and 210 high.

Alcantara, The Order of (originally of St Julian), takes its name from the town of A., where it has its seat. It dates as a military confraternity from 1156, but in 1197 Celestine III. made it a religious order of knighthood to animate it with increased zeal against the Moors. In 1495 Alexander VI. vested the grand-mastership in the Spanish crown. The knights, who are Benedictines, have since 1540 been freed from the vow of celibacy. Candidates must prove a nobility of four generations. The costume is green; the crest a pear-tree.

Alcara'z, a town of Spain, province of Albacete, formerly part of Murcia, lies not far from the source of the Guadarmena, an affluent of the Guadalquivir. It has considerable industrial activity in weaving and iron-working. It received its name from the Arabs, and was the scene of a great victory won by Alfonso I. of Aragon over eleven Moorish generals in 1123.

Alcazar de San Juan, a town of Spain, province of Ciudad Real (New Castile), 49 miles N.E. of Ciudad Real, on the Madrid and Alicante Railway. The name A. is Arabic, and signifies the castle or fortress. The place has manufactures of saltpetre, powder, chocolate, silks, and woollens. Pop. 7540.

Alce'do. See KINGFISHER.

Alchemilla, a genus of plants belonging to the natural order *Rosacea*. See LADY'S MANTLE.

Alchemy, a word of Arabic origin (*Al chemie*), used to designate the art which had for its main object the transmuting of the baser metals, such as lead and copper, into gold and silver. The origin of the art is somewhat obscure. The oldest alchemist of note of whom there is any record was the half-mythical Hermes Trismegistus (q. v.) of Egypt. He is said to have written many treatises, and is spoken of as the founder of A., which has been called after him the Hermetic art. At his death the secret results of his life-labour, engraven on emerald, were buried with him, but long afterwards they were exhumed by Alexander the Great, and found to be so obscurely written as to be unintelligible.

In the first centuries of Christianity the study of A. was limited to the East, and was principally cultivated in Alexandria. It was taken up by the Arabs during the famous Abbassid califates, and perhaps the most notable product of the Arabian school of A. is the *Summit of Perfection* by Gebir (q. v.), belonging to the 8th c., which is, indeed, the first book written on the subject of chemistry proper. In the 10th c. A. was brought to Spain by the Arabs, and soon spread over Europe. In Germany it found many eager votaries, and a kind of science or system of A. was gradually developed. It taught principally three things: first, that there was a *philosopher's stone*, the *great elixir* or *red tincture*, which could convert substances into gold; second, another stone, the small elixir, or *white tincture*, which could convert substances into silver; and third, that the philosopher's stone was at the same time a wonderful drug, which could restore youth to the aged, and give health and long life to the sick.

The leading alchemists were not quite agreed as to the physical properties and appearance of the stone, but that did not deter their followers from seeking for a treasure whose virtues were so great. Thousands spent their fortunes and wasted their lives in the vain search for the elixir, while a few declared they had found it, and publicly manufactured their false gold and silver for a credulous world. They were called *Adepts*. Kings and princes were among their number, and even coined their yellow alloy, and caused it to be received as gold. The Emperor Rudolph II., in the beginning of the 17th c., is said to have manufactured upwards of 80 cwt. of gold and 60 cwt. of silver. The power of continuing life, too, was said to have been discovered by some adepts, who had wealth and honours showered upon them as the price of their secrets.

Though ignorance and superstition were the soil in which A. grew rankest, and fraud and quackery too often the instrument of its propagation, yet many cultivated it honestly and with pure motives; and though they did not succeed in obtaining the wished-for treasures, yet they made many valuable discoveries, such as the manufacture of porcelain (Dresden china), and accumulated a vast multitude of facts which find a place in modern chemistry, a science which bears the same relation to alchemy that astronomy does to astrology.

Alcibiades was born at Athens B.C. 450. His father, Cleinias, fell at Coronea, and Pericles became his guardian. Connected with the noblest Athenian families, possessed of a large fortune, which his marriage with Hipparete greatly increased, and endowed with remarkable personal beauty, he entered on public life under the most favourable auspices. His inflexible will, restless energy, persuasive eloquence, and brilliant talents, however, were marred by his inordinate vanity, audacious violence, and unscrupulous ambition. He was through life the slave of passions, the deep-seated power of which his friend Socrates weakened, but was unable to subdue. On the death of Cleon, A. and Nicias became, in the Assembly, the rival advocates of conquest and peace. In B.C. 421 A. opposed Sparta, and effected an alliance with Argos, Elis, and Mantinea. In B.C. 415 he was the leading promoter of the memorable Sicilian expedition. He was sent out as one of the generals, but was soon recalled to Athens to stand his trial in connection with the mutilation of the Hermes busts. He escaped at Thurii, and went to Sparta, where he acted openly as the enemy of Athens. Having fled to Tissaphernes, he became once more the enemy of Sparta. He made overtures to the friends of oligarchy at Athens, but when the Four Hundred were assembled, he was not recalled. The soldiers at Samos then appointed him a general, and he remained abroad till he had gained the victories of Cynossema, Abydos, and Cyzicus, and had taken

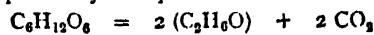
Chalcedon and Byzantium. He returned to Athens B.C. 407, and was received with great enthusiasm. His property was restored, and he was appointed commander-in-chief. In B.C. 406, however, by the defeat of his lieutenant Antiochus at Notium, he was once more disgraced. He lived in exile in Thrace, till, fearing Sparta, he fled to Pharnabazus, the satrap of Phrygia, who, at the instigation of the Thirty Tyrants, ordered his assassination. His house was surrounded and set on fire, and in attempting to escape A. fell pierced with arrows B.C. 404.

Alcira (anc. *Sebaticula*), a walled town of Spain, province of Valencia, on an island in the river Xucar, about 20 miles S.W. of Valencia, and a principal station on the Valencian Railway. It has earthenware and silk manufactures, and a large trade in agricultural produce. In the times of the Moors A. was called Algecira ('the island'). Pop. 10,300.

Alcman, the Spartan lyric poet, by birth a Lydian of Sardis, and a slave, flourished about 631 B.C. He wrote in the Doric dialect, and is said to have invented erotic poetry. Only a few fragments, of no great excellence, have come down to us.

Alco Dog, a variety or race of dogs existing wild in Mexico and Peru, and distinguished by the large drooping ears and small head. The A. was tamed in these countries before America was discovered. In all probability the variety took origin from the escape into a wild state of a domestic breed of dogs.

Alcohol is a liquid substance containing the elements carbon, hydrogen, and oxygen. Although not occurring in nature, it is always obtained from bodies of vegetable origin—namely, from the different kinds of sugar and starch. If these substances, mixed with a large proportion of water, are allowed to ferment with yeast, they are at first converted into *grape sugar*, and then this body becomes decomposed into A. and carbonic acid. This change is expressed by the equation—



Grape sugar. Alcohol. Carbonic acid.

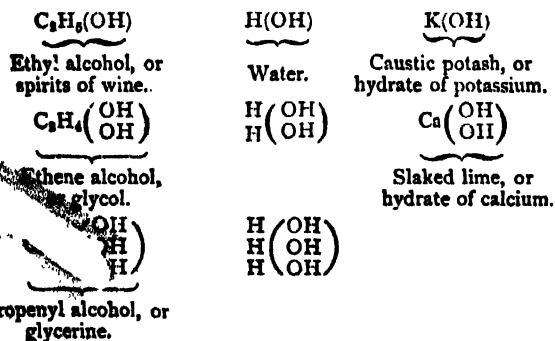
A dilute solution of A. is thus obtained, and from it the A. is partially separated by distillation, as it boils at a much lower temperature than water, and therefore distils over first. Owing, however, to the strong attraction of A. for water, the separation of the two can never be completed by distillation; the strongest *rectified spirits of wine* (as it is called) that can be prepared by this means containing about 9 per cent. of water. To obtain pure A., rectified spirit must be left in contact with quicklime for some time; the quicklime combines with the water contained in the spirit to form slaked lime, whilst the A. is not attacked, and may be distilled off. The A. thus prepared is called *absolute A.*, but still contains 1-2 per cent. of water. This may be removed by repeated rectification with metallic sodium. Pure A. is a colourless, limpid liquid of burning taste and characteristic odour. It readily ignites, and burns with a bluish flame, forming carbonic acid and water. It boils at 78° C., and has the specific gravity 0.809 at 0° C. It has a strong attraction for water, as already mentioned; so strong, indeed, that if the two be mixed, considerable rise of temperature takes place, and the mixture is observed to contract. A. is lighter than water (sp. gr. 0.809), and has never been frozen (hence its use as a fluid for thermometers to measure low degrees of temperature). A characteristic physiological property of A. is the intoxicating effect it produces when swallowed. Fermented Liquors (q. v.) contain A. in quantities varying from about 7 to 50 per cent., and owe their stimulating properties to its presence. A. is largely employed in the arts as a solvent of resins, fats, &c., but owing to the heavy duty levied on pure A., a mixture of it and wood-spirit, called *methylated spirit*, is employed for all ordinary purposes. No duty being levied on methylated spirit (as it cannot be rendered potable), it is of course much cheaper than pure A. *Proof-spirit*, largely employed in pharmacy in the preparation of tinctures, is a mixture of 49.5 per cent. of pure A., and 50.5 water.

Alcohol, Physiological and Medicinal Action of. This substance acts principally on the nervous system. In small doses it stimulates, in medium doses it perverts, and in large doses it destroys function. It acts not only on the nerve centres, more especially on the cerebral hemispheres—that part of the brain connected with the manifestation of the mental faculties—but also on the

nerves, both sensory and motor. Through the nervous system also it affects the quantity and quality of the various secretions and excretions. When A. is taken internally, modern research has shown that a portion of it is eliminated unchanged by the kidneys, skin, and bowels, while the remainder is consumed by oxidation, like any other non-nitrogenous alimentary principle. After excessive drinking, A. may be found in the various tissues, and in serum effused into the shut cavities of the body, such as the ventricles of the brain. Apart from any effect due to oxidation, alcoholic liquids exert an influence on special functions. For example, in moderate quantity, the activity of the circulation is increased; the heart beats more rapidly; the pulse is fuller and more frequent; the small vessels of the skin become filled with blood; there is a very slight increase in the average temperature of the body; the urinary secretion is increased, the appetite stimulated, and the functions of the nervous system, including the mental faculties, are exhilarated. Dr Parkes, of Netley, has shown that A. does not affect the amount of nitrogen eliminated daily. It does not enable the body to do more work on less food, but by stimulating a weak heart it may enable more work to be done. In other words, it elicits force without supplying it. The experience of all men accustomed to severe muscular exertion is that they can work better without A. than with it. Taken daily, even in small quantity, A. exerts a slow prejudicial effect on the system; taken immoderately, nothing, as life assurance authorities know, leads sooner to premature disease and death. Strong alcoholic beverages act injuriously on the stomach, liver, and nervous system. The various alcoholic beverages owe their chief properties to A., but they differ in their effects generally, according to the associated constituents that may happen to be present. See under WHISKY, RUM, WINE, &c. As medicinal substances, alcoholic fluids may often be of great service. Small doses are useful in some cases as stimulants to digestion and secretion; and larger doses, in cases of extreme prostration from the effects of fever or exhaustive disease, may save life by keeping up the action of a flagging heart until the body recovers from the exhaustion. At one time many diseases were treated by an excessive use of stimulants; now it is not so. Such remedies are used with caution, and therefore with greater success.

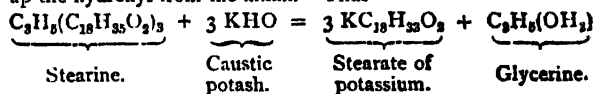
Alcoholism. In a large dose alcohol destroys life, and may thus be regarded as an active poison. In smaller doses, frequently repeated, it acts prejudicially on all the important organs, more especially on the stomach, liver, kidneys, and nervous system, and it may produce various kinds of nervous disease which are included under the general term A. Those directly referable to alcohol are, Delirium tremens, Mania à potu, and Dipsomania. See under these heads.

Alcohols. The A. form a large and important group of compounds, containing the elements carbon, hydrogen, and oxygen, and resemble in their chemical properties common alcohol or spirit of wine. In their chemical relations they are analogous to the hydrates of the metals, and are indeed regarded as the *hydrates of hydrocarbon radicals*, or substances derived from a water by the partial replacement of its hydrogen by hydrocarbon radicals. Thus—

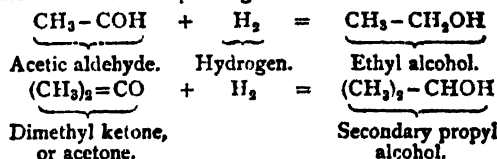


According as the alcohol contains one, two, three, four, &c., quantities of *hydroxyl* (that is to say, the group OH); in other words, according as it is derived from one, two, three, four, &c., molecules

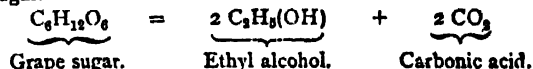
of water, it is said to be *mon-atomic*, *di-atomic*, *tri-atomic*, *tetr-atomic*, &c. Thus ethyl alcohol, $\text{C}_2\text{H}_5(\text{OH})$, and methyl alcohol, $\text{CH}_3(\text{OH})$, are monatomic; ethene alcohol, $\text{C}_2\text{H}_4(\text{OH})_2$, diatomic; propenyl alcohol, or glycerine, $\text{C}_3\text{H}_5(\text{OH})_3$, triatomic; mannite, or manna, $\text{C}_6\text{H}_8(\text{OH})_6$, hexatomic. Besides the above classification of these bodies according to their *atomicity*, they are further divided into *primary*, *secondary*, and *tertiary* A. A primary alcohol, when submitted to the action of oxidising agents, loses two atoms of hydrogen and forms an *aldehyde*, the aldehyde in its turn readily taking up an atom of oxygen to form an *acid*. A secondary alcohol also loses two atoms of hydrogen in the first stage of its oxidation; the body, however, which results is not an aldehyde, but a *ketone*, a substance which, on further oxidation, splits up into two acids. A tertiary alcohol absorbs oxygen at once without forming an intermediate compound, and splits into various acids. The A. are prepared by various processes, and many of them occur ready formed in nature, or are produced by simple processes from natural substances. The most important and general method of preparation consists in treating the *ether* or corresponding hydrocarbon salt with alkalis. In this manner glycerine is prepared from the different kinds of fat, which are the stearic, oleic, palmitic, or margaric ether of the hydrocarbon radical glyceryl or propenyl. The alkali removes the acid radical from the ether to form an alkaline salt (in the case of the fats these salts are called *soaps*), whilst the hydrocarbon radical takes up the hydroxyl from the alkali. Thus—



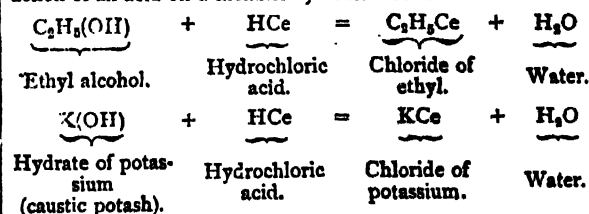
The process by which an alcohol is obtained from an ether by treatment with alkalis is called on this account *saponification*. Primary A. may be obtained by treating the corresponding aldehyde with nascent hydrogen, and secondary A. in the same manner from the corresponding ketone. Thus—



Besides these general methods of preparation, there are also special processes by which certain A. are obtained. Methyl alcohol, $\text{CH}_3(\text{OH})$, is obtained in large quantity by the dry distillation of wood. Ethyl alcohol, $\text{C}_2\text{H}_5(\text{OH})$, by the fermentation of sugar.



The process of fermentation also gives rise to other A., such as the butyl alcohol, $\text{C}_4\text{H}_9(\text{OH})$, and amyl alcohol, $\text{C}_5\text{H}_{11}(\text{OH})$, though in smaller quantity. Grape sugar, cane sugar, starch, and woody fibre are substances closely allied to the A., and exist ready formed in the tissues of plants. A., when treated with acids, become converted into *ethers*, and water is produced at the same time. This may be considered as the most characteristic reaction of the group, and is entirely analogous to the action of an acid on a metallic hydrate. Thus—



The chlorides, bromides, and iodides of phosphorus act upon the A. in a similar manner, giving rise to the chloride, bromide, or iodide of the hydrocarbon radical.

Alco'ra. a town of Spain, province of Valencia, 43 miles N.N.E. of Valencia. has manufactures of earthenware and brandy, and a good trade in fruits. Pop. 5609.

Alcornoco or **Alcornoque Bark** is the bark of several species of *Byrronima*, a genus of plants native of tropical America. The cork-oak bark is the *A.* of Spain.

Alco's (Spanish, *alcoba*, from the Arabic, *al-kawf*, the tent), a kind of recess in a chamber where a couch or bed may be placed, at one time very common in France, but now disused.

Alooy, a walled town in the province of Alicante, Spain, picturesquely situated on a height at an angle formed by the confluence of two streams. It has numerous cloth and paper manufactories. Of the 200,000 reams of paper produced here annually, 180,000 are used for making *papelitos* or cigarettes. Pop. 21,900.

Alcudi's, Manuel de Godoy, Duke of, a Spanish adventurer, born at Badajoz in 1767, entered the body-guard of Charles IV. of Spain, and, owing to his address and musical ability, became a court favourite and attained wealth and titles, rising to the rank of generalissimo of the Spanish forces in 1804. He fell with the Bourbons before the power of Napoleon; but he continued to enjoy the favour of Charles IV. and his queen, and was their chief adviser in their exile at Bayonne. After the revolution of 1830 he was dependent for a time upon the charity of Louis Philippe; but in 1847 his fortune and titles were restored to him, and he was allowed to return to Spain. He died at Paris, 7th October 1851. *A.* was a conspicuous figure in his time, but has left no mark on the history of his country. See *Mémoires de A.* (Par. 1836.)

Alcuin, or **Alowin**, the most cultivated, energetic, and influential scholar of the 8th c., belonged to a noble English family, and was born at York in 735. He received his education under Aelbert, then head of the monastery school at York, and when his teacher became archbishop in 766 A.D., *A.* took his place. On a journey to Rome in 781, to obtain the *pallium* for Aelbert's successor, *A.* made the acquaintance of Charlemagne at Parma, and was persuaded by him to settle in France. From 782 to 796 he resided at the imperial court, and lived in the closest intimacy with the great monarch, who successively bestowed on him the abbey of Ferrières, St Loup, St Iossa, and St Martin. The palace became a sort of school or academy, of which *A.* was the head, while Charlemagne, Eginhard and his family, with many of the principal courtiers, were the pupils. Each was known by some antique name: Charlemagne was *David*; *A.*, *Flaccus*; Angilbert, the Chancellor, *Homer*, &c. This was the origin of those royal or *palatine* schools whose fame rivalled that of the monastic or episcopal seminaries. The influence of *A.* was felt over the whole of France. A great educational revival took place. New schools were founded and old ones were enlarged and improved. After his retirement to the Abbey of St Martin at Tours (796), he established there a great library, while the school, mainly by his own efforts, became the resort of all the studious youth among the Franks. *A.* died 19th May 804. His writings are numerous, and comprise theology (exegetical, dogmatic, and polemical), ecclesiastical history and poetry, mathematics, rhetoric, and a large mass of correspondence with popes, bishops, and monarchs. They were first collected and published by André Duchesne of Tours, under the title *Alcuini Abbatis Opera, que hactenus reperi potuerunt, omnia* (Par. 1617). A better and fuller edition is that of Froben, prince-abbot of St. Emmeran (2 vols. Ratisbon, 1777). See also Lorenz, *A.'s Leben* (Halle, 1829), transl. into Eng. (Lond. 1837); Guizot, *Histoire de la Civilisation*, vol. ii. (Par. 1840); Duperron, *Quelques aperçus sur Alcuin* (Valogne, 1850); and Kaulich, *Geschichte der Scholastischen Philosophie* (Frag. 1863).

Alcyonella. This animal is included in the class *Polyzoa* (q. v.). It is therefore one of the *Mollusca*, and has no relations with the *Alcyonium* (q. v.), one of the *Cœlenterate* animals, with which, however, in name it is apt to be confused. These animals form compound masses, including large numbers of animals, and are found in fresh-water ponds or streams. As in most fresh-water *Polyzoa*, the tentacles surrounding the mouth of each little animal—or *polypide*, as it is termed—are arranged in a crescentic or horse-shoe fashion. Hence *A.* belongs to the division *Hippocrepia* or *Phylactolamata* of the *Polyzoon* class. The tentacles are very numerous, numbering sixty or more. The entire mass of an *A.*—of which the common species is

the *A. stagnorum*—is usually found adhering to the leaves of aquatic plants. It presents the appearance of a dark-green mass of jelly-like consistence, from amid the substance of which hundreds of little polypides, the head of each surmounted by a crown of tentacles, may be seen protruding. The polypides are said to number about 1600 on each square inch of the mass. The tentacles are fringed by minute vibratile filaments termed *cilia*, and their functions are those of drawing particles of food towards the mouth, and of probably assisting in the breathing of the animals. A perfect digestive system exists. No heart, however, is developed. Each little member of the colony can produce ordinary eggs, from which a primitive polypide is developed, and this gives rise by budding to the compound mass. Other eggs in bodies, termed *statoblasts* or *winter ova*, are also found. These latter remain within the body of the organism during the winter, and on being liberated in spring give origin to embryos, which by budding develop the compound forms.

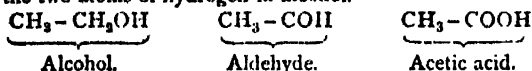
Alcyonidium, a genus of animals included in the class *Polyzoa* of the sub-kingdom *Mollusca*. These animals have no relations with the *Alcyonium* (q. v.) or 'dead man's finger' polype, which belongs to a much lower group of the animal world (*Calenthrata*). These widely-different forms were, and still are, often confused. The *Alcyonidia* belong to the *Infundibulate* section of the class *Polyzoa* (q. v.), which section includes those forms possessing tentacles arranged in a circular manner round the mouth.

Alcyonium, a genus of polypes or *Cœlenterate* animals forming the type of the order *Alcyonaria*, and popularly known under the names of 'dead man's fingers' and 'cow's paps.' These names have been applied to this organism from the resemblance it presents in outward appearance to lobate, fleshy, or finger-shaped masses, each of which masses consists of a colony of several hundred polypes, united to form a composite organism. The common species is the *A. digitatum*, frequently dredged on our coasts, and which is attached in its normal state to mussel-shells, stones, and other objects. On looking at the fleshy mass when in the living state, its surface is seen to be studded over with little star-shaped polypes, the appearance of which can be more satisfactorily investigated by aid of a hand-lens. Each individual polype possesses eight fringed tentacles surrounding the mouth—the little organisms bearing a resemblance to sea-anemones, which familiar animals indeed constitute the type of the class in which the *Alcyonaria* are included. The polypes possess the power of retracting themselves within the common body-substance of the organism, to which the term *cœnosarc* has been applied. This process of retraction is effected by invagination of the polypes—a process imitated by pushing in the finger of a glove upon itself. Externally, the *cœnosarc* is of leathery or coriaceous consistence, and within this a softer tissue is contained, through which a system of canals is distributed, these canals being simply internal prolongations of the bodies of the little polypes. Through the canal-systems the various members of the colony are brought into communication with each other; and a continual circulation and interchange of nutritive fluids takes place through the tubes, the growth and nourishment of the entire colony being thus provided for. The *cœnosarc* is strengthened by spicules or crystal-like bodies of lime scattered throughout its substance. These calcareous spicules are of cruciform shape, and represent the *coral secretion* of the organism; which secretion, although of rudimentary nature, is yet of essentially similar type to the more perfect corallum of other forms. The order *Alcyonaria*, indeed, includes the red coral of commerce, and other familiar kinds. The internal structure of each polype is essentially that of the sea-anemone. The mouth, surrounded by its tentacles, leads into a stomach-sac, which is incomplete inferiorly, and is continued into the canal system which permeates the entire mass. The stomach is connected to the walls of the body by vertical partitions or *mesenteries*, which number four, or some multiple of that number. The entire compound mass or organism is formed by a process of continuous germination or budding. One single and primitive polype, produced from an egg, first attaches itself, and gives rise by budding to the compound mass. The individual polypes of the mass—or *zooids*, as they are termed—possess each the power of developing eggs, the reproductive organs being situated on the surface of the *mesenteries*. A second species of *A.* is the *A. poculum*, popularly known as

'Neptune's cap,' and found in the seas of Sumatra and Singapore. The genera *Alcyonidium* and *Alcyonella* are entirely different animals from the A., and belong to the *Molluscan* sub-kingdom of animals, being included in the class *Polysoa* of that division. See *ALCYONIDIUM* and *ALCYONELLA*.

Aldeb'aran, the Arabic name of the most brilliant star in the Hyades, a group of five in the head of Taurus. It nearly forms a straight line with the three bright stars in the belt of Orion.

Al'dehyde, or **Acetic Aldehyde**, is a substance prepared by the partial oxidation of common alcohol or spirits of wine, and differs in composition from the latter in containing two atoms less hydrogen, whence its name (*al*-cohol, *dehyd*-rogenatum). It is also related to acetic acid, the latter containing an atom of oxygen more than the A., or an atom of oxygen in place of the two atoms of hydrogen in alcohol.

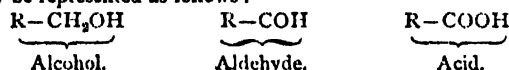


A. is best obtained by heating a mixture of bichromate of potash, alcohol, and dilute sulphuric acid in a retort connected with a good condensing apparatus; a somewhat violent action takes place, and the A. being a very volatile substance distils over. In this process the bichromate of potash gives part of its oxygen to the alcohol, which is thus converted into A.

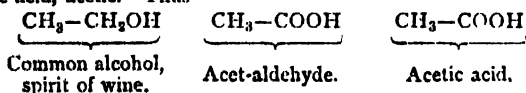
A. is a colourless, mobile liquid of penetrating odour, lighter than water (sp. gr. .805), and soluble in all proportions in water, alcohol, and ether. It boils at 21° C., and is readily inflammable. It decomposes by long boiling, and indeed suffers change if kept for some time in sealed tubes, becoming converted under the latter conditions into polymeric substances called *paraldehyde* and *metaldehyde*. The chemical properties of A. are similar to those of others of its class, and are described in art. *ALDEHYDES*.

A. is employed in the manufacture of certain Aniline Colours (q. v.), and is one of the ingredients of sweet spirits of nitre.

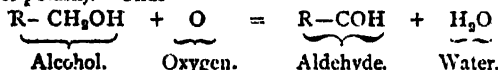
Aldehydes are substances which resemble in their reactions common or acet aldehyde. The two distinctive characteristics of these bodies are—first, that they readily take up an atom of oxygen, and pass into the corresponding *acid*; second, that they combine with nascent hydrogen to form the corresponding *alcohol*. If 'R' designate any monatomic hydrocarbon radical, the relations in composition between the alcohols, A., and acids may be represented as follows:—



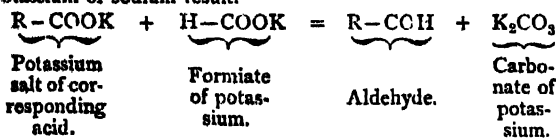
In the case of acet-aldehyde the radical is methyl, CH_3 ; the corresponding alcohol, common alcohol, or spirit of wine, and the acid, acetic. Thus—



There are two general processes by which these substances may be obtained. The one consists in oxidising the corresponding alcohol (usually by heating it with sulphuric acid and bichromate of potash). Thus—



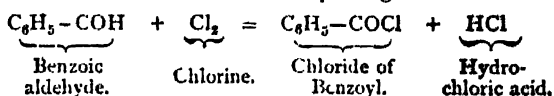
The other in submitting a mixture of formate of potassium or sodium, and the potassium or sodium salt of the corresponding acid, to dry distillation, when the aldehyde and carbonate of potassium or sodium result.



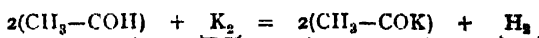
Some A. occur in nature, or are produced from natural substances by simple processes. *Benzoic aldehyde*, or oil of bitter almonds. $\text{C}_6\text{H}_5 - \text{COH}$, is produced when crushed almonds are

moistened with water and allowed to ferment. *Cinnamic aldehyde*, $\text{C}_9\text{H}_7 - \text{COH}$, is the principal constituent of oil of cinnamon or cassia. *Cuminic aldehyde*, $\text{C}_9\text{H}_{11} - \text{COH}$, occurs in oil of cumin and in that of the water-hemlock. *Salicylic aldehyde*, $\text{C}_6\text{H}_5\text{O} - \text{COH}$, in the flowers of the meadow-sweet. *Angelical aldehyde*, $\text{C}_8\text{H}_7 - \text{COH}$, in oil of chamomile.

Besides the action of oxidising and reducing agents on the A., they possess other properties in common. All of them form crystalline compounds with bisulphite of soda, and also with ammonia—reactions which supply the chemist with a means of detecting and purifying an aldehyde. Chlorine and bromine replace an atom of hydrogen in the A., and form the chloride or bromide of the corresponding acid radical.



The alkali metals evolve hydrogen when heated with an aldehyde, and form a kind of salt.



Acet aldehyde. Potassium. Potassium-aldehyde. Hydrogen.

Alder, the common name for *Alnus*, a genus of trees belonging to the natural order *Betulacea*. The common A. (*A. glutinosa*) is the only species indigenous to Britain, and attains, in favourable situations, a height from 40 to 60 feet. Its wood when first cut is white, but becomes of a bright orange-red colour on exposure. Although soft and light, it is very durable under water. Its branches are much used for charcoal in the manufacture of gunpowder. The bark contains tannin and dye, and is frequently used by fishermen to stain their nets. A. is the badge of the clan Chisholm. Berry-bearing A., Black A., Red A., and White A. are popular names given to plants belonging to totally different natural orders.

Alderman (originally Ealdorman, i.e. older or elder man), the title of a civil magistrate, or of the assessor of the principal civil magistrates in an English or Irish municipality. For a notice of the special functions of those anciently invested with the title A. of all England, or of the King's A., see *ANGLO-SAXONS*.

Alderney (Fr. *Aurigny*, Lat. *Aurinia*), one of the Channel Islands (q. v.), lies about 7 miles from the coast of Normandy and 60 from England, in N. lat. 49° 45', W. long. 2° 13'. It is separated from Cape La Hague by the Race of A., a dangerous channel in coarse weather. The island is about 4 miles long, 1½ in breadth, and has a circuit of 12 miles. The coast to the S.E. is wild and precipitous, but slopes gently towards the N., where has been constructed an extensive breakwater and harbour of refuge. The climate of A. is healthy, and the soil inland is rich and well cultivated. The island is famous for its breed of cattle. The inhabitants are of French origin, but English is the language generally spoken. The 'town,' so called, occupies the centre of the island, and contains a church supposed to have been built in the 12th c., which some time ago was replaced for purposes of worship by a building in the early English style. A. is a dependency of Guernsey, under the British government; and the civil power is exercised by a judge appointed by the crown, and six *jurats* elected by the people. It has a court of justice, and a local legislature composed of the judge, jurats, and 'twelve' popular representatives (hence called *douzainiers*), who, however, have only a deliberative power. Pop. (1871) 2738.

Aldershot Camp, originally (1855) formed on a wide heath on the frontiers of Surrey, Hants, and Berks, to afford facilities for manœuvring our regiments in brigades. The lessons of the Franco-Prussian war of 1870-71 proved that immense strides had been made in military science in Germany. The wonderful improvements in field artillery, resulting in greatly increased range and precision, and the introduction of breech-loading rifles in line regiments overturned at once the formerly-existing theory and practice of military drill. It became evident that the famous 'square,' as presenting an admirable compact target for artillery playing from a great distance, was a formation that must never again be had recourse to in warfare. It

further appeared that, as an arm of the service, cavalry was now rendered almost useless, except for the performance of special and occasional duties, acting as scouts, reconnoitring, out-flanking field artillery, and attacking the battery at a sudden dash, and in the pursuit of a retreating force. But the 'charge,' in the old sense of the movement at least, must, it was clear, be given up. A line of infantry armed with breechloaders could empty the saddles of any number of cavalry before a collision could take place; and even in the event of the 'charge' being delivered, the bayonet must be held invincible. The means by which victory in the field is now achieved having changed completely within the last few years, important changes had to be introduced in military drill. Chief among these is the infantry 'advance in loose order,' a movement intended to have the advantages, with others in addition, of the Prussian 'swarm.' For the necessary evolutions (see MILITARY DRILL) great space is required, and the camp at A. affords unusual facilities for practising them. A. is divided into the N. and S. Camp by the Basingstoke Canal. The troops are housed in excellent barracks, while a town is springing up in the neighbourhood. The extent of ground used for military exercises is 4144 acres, and the camp can accommodate 20,000 men. The number of troops encamped here on January 1, 1874, was 10,601, with 2198 horses and 48 guns.

Aldine Editions, so called from the name of the printer, Aldo Manuzio (q. v.), of Venice, were wont to be much sought after by book-collectors. Some of them are *éditiones principes* (first editions) of Greek and Roman classics, others give collated texts of Italian authors, while all are beautifully and correctly printed. Aldo Manuzio, an enthusiast in typography, had nine different kinds of Greek types made, and fourteen of Roman, and was the first to use *italics* in his 8vo *Virgil* (1501). He likewise introduced the custom of having fine-paper copies in addition to those on ordinary paper. The *Epistola Græca* (1499) furnished the earliest instance of this. He died in 1515. His son Paolo (died 1597) was also an enthusiast, but more with respect to the Latin than the Greek classics. During the century that the A. press continued in operation it printed 908 separate works. The mark is an anchor round which a dolphin twines, and the motto is *Sudavit et aluit*. About 1502 counterfeit Aldines began to be issued at Lyon and Florence. Renouard, a Paris bookseller (who died in 1853), formed a very complete collection of genuine Aldines, of which he has given a catalogue in his *Annales de l'Imprimerie des Aldes, ou Histoire des trois Manuce et de leurs Éditions* (Paris, 1803; 3d ed. 1834). The name A. was given by Pickering to a beautifully-printed edition of the British poets, and has been retained in the revised issue by Bell & Daldy (Lond. 1870).

Aldobrandini, a distinguished Tuscan family, settled at Florence in the 12th c. During the middle ages it was particularly known for its attachment to the Guelph party, and furnished the Church in later times with a succession of ecclesiastical dignitaries. The most eminent of its members were—**SILVESTRO A.** (born 1499, died 1558), a politician and juriconsult, one of whose sons was Pope Clement VIII.; **GIOVANNI A.** (born about 1525, died 1573), a son of Silvestro, a cardinal of the Church, and a writer on jurisprudence; **TOMASO A.** (born 1540, died early in the 17th c.), also a son of Silvestro, a fine scholar, whose translation of the *Lives of the Philosophers*, by Diogenes Laertius, was published after his death by his nephew, Pietro A., Archbishop of Ravenna, himself an accomplished writer; **CINZIO-PASSERO A.**, died about the beginning of the 17th c., the son of a sister of Pope Clement VIII., became a cardinal in 1593, and was a great friend of Tasso, who dedicated to him the *Gerusalemme Liberata*; **PIETRO**, brother of Cinzio-Passero, also rose to be a cardinal, and as papal legate in France, settled the differences between Henry IV. and the Duke of Savoy; another brother, **FRANCESCO A.** (born 1546, died 1601), embraced the military profession, and distinguished himself in fighting against the Turks in Hungary; **SILVESTRO**, son of Francesco, obtained the dignity of cardinal in his fourteenth year. The family became extinct in 1681 by the death of Octavia, daughter of **GIOVANNI GEORGIO A.**, Prince of Rossano.

Aldrich, Henry, D.D. (born in 1647, died in 1710), was educated at Westminster School and Christ's Church, Oxford. He was a man of varied accomplishments—a logician, a musi-

cian, and an architect. His treatise on logic (*Artis Logica Compendium*) still maintains its ground at Oxford; his musical compositions comprise specimens both sacred and secular. Among the latter are, *Hark, the Bonny Christ Church Bells*, and *A Smoking Catch*. His architectural skill is attested by Peckwater Quadrangle, Christ Church, Trinity College Chapel, and the Church of All Saints. He also wrote several tracts on the real presence.

Aldrovand'i Ulissi, a naturalist, born at Bologna, 11th September 1522, appeared first as an author in a treatise on the statuary of the ancients (1556), but subsequently devoted himself to the study of botany. In 1560 he succeeded to the chair of natural history, and formed a valuable collection of specimens for a work which he had projected on that science, and of which thirteen volumes were published, six under his own direction, and seven under that of his colleagues after his death in 1607. Many of his specimens are still to be found in the Public Museum of Bologna. The Botanical Garden of that city also owes its establishment to A. The opinion, sanctioned by Bayle, that he died in utter poverty, the result of expenditure on pursuits connected with his favourite science, is proved by Fantuzzi, from an examination of the archives of Bologna, to be groundless. On the contrary, he appears to have been treated by the Senate with the greatest liberality. Though chargeable with being sometimes unnecessarily minute in unimportant details, all his writings are marked by fulness of knowledge and the most reverent spirit. A complete list of his works is given in the *Nouvelle Biographie Générale*. See Fantuzzi's *Memoria della Vita d'Ulissi Aldrovandi* (Bologna, 1774).

Ald'stone, or **Alston Moor**, a market town in Cumberland, lies near the confluence of the Neut and S. Tyne, in a hilly district, 29 miles S.E. of Carlisle. The chief manufactures are thread and flannel. The once highly-productive lead mines in the vicinity are now comparatively exhausted. Pop. (1871) 2627.

Ale, a fermented liquor prepared from the pale dried malt of grain, usually barley. The word, which is the modern form of the Anglo-Saxon *eale*, is probably from the Danish *øl*, malt liquor. It is now used indiscriminately with beer, but this term may include both porter and A. In England the name A. is mostly restricted to the pale, highly-hopped varieties of the beverage originally prepared for export, while in Scotland it is chiefly applied to the sweet and alcoholic liquors, which are known in the market as Scotch ales. See BEER and BREWING.

Al'eman, Mateo, the author of *La Vida y Hechos del Picaro Guzman de Alfarache* (*The Life and Adventures of Guzman de Alfarache*), was born at Seville in 1550, and served with honour as one of the comptrollers of finance under Philip II. of Spain. Retiring from office, he betook himself to literature. His great work (published in 1599), the hero of which is a scamp and rogue who goes through various scenes and situations, is a caustic and humorous satire on the idle, dissolute manners of his age, and is written in the choicest Castilian. It was translated into all the principal languages of Europe previously to the author's death, the date of which is unknown, but which took place in Mexico. The best edition is that by Aribau in the *Biblioteca de Autores Españoles*, t. iii. (Mad. 1846). Three editions of an English translation by Mabbe, Magdalen College, Oxon., appeared in 1622-23, 1630, and 1634 respectively.

Aleman'ni (lit., *all-men*), the name borne by a military league of German tribes, of which the Teneteri and Usipi were the most important. They made their earliest appearance in the beginning of the 3d c. in the valley of Main, and soon after began to threaten Gaul. The first Roman that inflicted on them serious defeat was Maximinus, who in 236 A.D. drove them back over the Rhine, which they had already crossed. In a second invasion of Gaul they were again defeated by Posthumus, who pursued them into Germany, and strongly fortified the Roman frontier along the Main and the Upper Danube. Part of Posthumus's defences remain to this day. After the death of the Emperor Probus (282) the Burgundians, pressing from the N.E., forced them inside the Roman fortifications, when they settled in the region between Mainz and Lake Constance, but in the 4th c. they had spread as far W. as the Vosges Mountains, and as far S. as the Swiss Alps. Julian

signally chastised them in 357 A.D., but it was not till the time of Clovis that they were finally subdued (496), and compelled to acknowledge the sovereignty of the Franks. In the course of the 5th c. the league of the A. began to be called Suavi or A. and Swabians. Under the Franks the Alemannic territory was formed into a duchy, the eastern part of which has specially borne the name of Swabia since the time of the Emperor Henry IV. The proximity of the A. to the kingdom of the Franks accounts for the name of *Allemands* and *Allemagne* which Frenchmen use to denote Germans and Germany.

Alembert, Jean le Rond d', a celebrated mathematician and philosopher of the 18th c., was born in Paris on the 16th November 1717. He was the illegitimate son of a Madame de Tencin, by whom he was abandoned on his birth on the steps of the church of St Jean-le-Rond, where he was found by a policeman, who intrusted him to the wife of a glazier named Rousseau. Subsequently his father, a M. Destouches-Canon, a provincial *commissaire d'artillerie*, made him an allowance of 1200 francs a year. Entering the College Mazarin at the age of twelve, he soon began to show high mathematical talent; but at the conclusion of his college course, with a view to self-support, he tried to study first law and then medicine. The effort, however, was vain, and ultimately he devoted himself absolutely to science. In 1739 he published his *Mémoire sur le Calcul intégral*; in 1741 he was admitted a member of the Academy of Sciences; in 1743 appeared his *Traité de Dynamique*, and in 1746 his *Théorie Générale des Vents*, which gained the prize of the Academy of Berlin. This was followed by many other learned and scientific works, which so raised their author's fame that in 1752 Frederick II. of Prussia offered him the presidency of the Academy of Berlin. A., however, could not be induced to leave France, and when Catherine II. of Russia, ten years afterwards, also invited him on munificent terms to superintend the education of her son, he again refused. As editor of the mathematical section of the famous French *Encyclopédie* he has an enduring place in the history of literature. A. was never married, but a strong attachment existed between him and a Mademoiselle Espinasse, whose death was a deep affliction to him. He died 20th October 1783. A.'s literary works were collected and published first by Bastien in 1805, and afterwards in a more complete form by Bossange (Paris, 1821, 5 vols. 8vo), but his scientific works have not been collected. Condorcet's *Éloge* contains an eloquent and acute estimate of his philosophical and literary merits.

Alem'bio. A kind of still used by the alchemists. See DISTILLATION.

Alemte'jo (beyond the Tagus), the largest province of Portugal, stretches across the entire breadth of the country, and is 150 miles from N. to S.; area 9982 sq. miles. It is diversified by mountains, valleys, and plains, and is watered by the Tagus, Guadiana, and Saado. Dense forests cover the mountains of the N.; at their base is found in abundance wheat, rice, maize, the vine, citron, and pomegranate; but the plains in the S. are sterile and marshy tracts nearly destitute of vegetation. Goats, sheep, and swine are reared in large numbers; also asses, mules, and horned cattle. There are few manufactures; and even agriculture is very backward. The chief towns are Evora, the capital, Elvas, Portalegre, Beja, Estremoz, and Mertola. Pop. (1871) 331,341.

Alençon, on the Sarthe, chief town of the department of Orne, France, 75 miles S.W. of Rouen, and 92 miles W.S.W. of Paris. There are manufactures of woollen and linen fabrics, hosiery, and lace. Two industries have much declined—the production of A. point-lace, and the cutting of quartz-crystals in imitation of diamonds. Pop. (1872) 13,434.

Dukes of A. The first duke was Pierre, son of Louis IX., died without issue in 1283, when the title passed to the house of Valois, in the person of Charles, who fell at Crecy, 1346. The fourth duke, Charles, commanded the French vanguard at Pavia (1525), when his flight occasioned the disastrous overthrow of the French. Various members of the royal family of France have held the duchy, the last being Louis XVIII. The present duke (1875) is Ferdinand Philippe, son of the Duke of Nemours, born 12th July 1844.

Allep'po, the capital of a vilayet of the same name, Asiatic

Turkey, on the small river Koik or Nahr-el-Haleb, between the Orontes and the Euphrates. The name A. is an Italian form of the Arabic *Haleb*, which is in turn a corruption of the original Greek name *Chalybon* or *Chaleb*. Under the Romans the place was known as Beroea, but on its conquest by the Arabs in 638, it resumed its ancient designation. The town is partly surrounded by a wall built by the Seljuk Turks, who made A. their Syrian capital (998–1117). Girt with plantations of pistachio-nut-trees, above which rise countless cupolas and minarets, A. is one of the most beautiful of Eastern cities. It was partly destroyed by an earthquake in 1822, but has since been rebuilt. A. has a large trade in silks, skins, cotton, tobacco, wine, and oil. It is a station of the Indo-European telegraph, and its ports are Iskanderoon and Latakia. Pop. (*Almanach de Gotha*, 1875) 70,000.

Ale'sia, a town of ancient Gaul, near the site of which stands Alise, 24 miles N.W. of Dijon. In B.C. 52, 80,000 Gauls shut themselves up in A. under Vercingetorix; but after a vigorous resistance the place was obliged to surrender to Cæsar, who made Vercingetorix prisoner. The Normans destroyed A. in 864.

Ale'sius, Alexander, whose family name was **Alano**, one of the earliest Scottish reformers, and a fine theological scholar, was born at Edinburgh in 1500, studied under Joannes Major at St Andrews, and was for some time a canon of the Augustinian priory there. Converted to Protestantism by Patrick Hamilton, whose martyrdom he witnessed, A. soon drew upon himself the hatred of the monks by the aggressive style of his preaching, and found it advisable, about 1530, to escape to the Continent. After wandering about in various countries, he settled at Wittenberg in 1531, and became very intimate with Melancthon, who held his talents and judgment in great respect. In 1535 he passed over to England, carrying with him a copy of Melancthon's *Loci Communes* as a present for the English king. He was well received, and was permitted to lecture on theology and Hebrew at Cambridge University. The persecuting statute known as the 'Six Articles' forced him in 1539 to return to Germany. In 1540 he became a professor of theology in the University of Frankfurt-on-the-Oder, and in 1543 was transferred to that of Leipzig, where he spent the rest of his life. His death took place 17th March 1565. Although almost forgotten now, he was highly honoured in his own age, and really deserves remembrance. Bishop Bale dedicated to him and Knox that part of his biographical work which celebrates the 'illustrious' worthies of Scotland. His writings are numerous, but are confined to the departments of exegetical and polemical theology.

Alessan'dria, the chief town of a province of the same name in N. Italy, situated near the confluence of the Bormida and Tanaro. It was founded in 1168 by the Lombard Republics, and designed as a fortress to defend the passage of the Bormida and Tanaro against Frederick I. It was originally called Cæsarea, and received its present name in honour of Pope Alexander III. After the battle of Marengo, 1800, it was ceded to the French, who held it for fourteen years. During the Lombardo-Venetian rebellion, 1848–49, A. formed the headquarters of the Piedmontese. It is now one of the strongest fortresses in Europe. Apart from the garrison, it has (1872) 57,079 inhabitants, with considerable trade in linen, woollen, and silk fabrics.

Alessandria della Rocca, a town in the Sicilian province of Girgenti. The commune of which it forms part has a population of 5214.

Alet'ria, a genus of N. American plants belonging to the order *Hamodornaceæ*. *A. farinosa*, which is a perennial plant about 1/2 feet high, is called the colic root or star-grass. It is a very intense bitter, and has been used both as a tonic and a stomachic.

Aleu'rites, a genus of Euphorbiaceous plants containing only one species, *A. triloba*, or the candleberry-tree. It grows to a height of about 30 feet, and is cultivated in almost all tropical countries for the sake of its fruit, which contains two seeds resembling walnuts. The kernels, when dried, are stuck on a reed, and used as candles by the Polynesian islanders. When pressed, they yield a quantity of pure oil, which is used as a drying oil for paint. It has been imported into Britain, but not to any extent. The cake, after the oil has been expressed, is

employed as a food for cattle. The roots of the tree yield a dye, which is used by the Sandwich Islanders.

Aleutian Islands, or the **Catherine Archipelago**, a chain of about 150 islands in the N. Pacific, lying between the peninsula of Alaska in America and Kamchatka in Asia. They form an arc, lying in 55° N. lat., and are about 600 miles long. Behring's Island, Unalaska, Umnak, and Unimak are the largest. The W. islands belong to the United States (see ALASKA), the E. to Russia. They are all rocky and volcanic, several volcanoes being still active. Vegetation is scanty, and consists of bushes, lichen, mosses, and grasses. Birds, foxes, dogs, and reindeer are numerous. The inhabitants, of Kamchatkan origin, were converted to Christianity by Russian priests. They number about 10,000, and trade in fur and fish.

Alexander the Great, son of Philip of Macedon, and Olympias of Epirus, through whom he traced his descent from Achilles, was born at Pella, B.C. 356. His education was most thorough, and was specially distinguished by the remarkable influence exercised over him by the philosopher Aristotle. He was his father's pupil in the art of war, and his first military distinction was achieved at Chæroneia, B.C. 338. The murder of Philip, B.C. 336, called A. to the throne under circumstances well fitted to test his powers to the utmost. He put to death Attalus, who aspired to the throne. He marched S., and was appointed by the submissive Greeks his father's successor as the champion of Greece against Persia. He promptly returned N., crossed the Helms, and advanced as far as the Danube, subduing the various barbarous nations. Meanwhile the Thebans, deceived by a rumour of his death, revolted; but 'the great Emathian conqueror,' descending by rapid marches, took fearful vengeance upon them, and thus struck terror into the rest of Greece. Thebes was wholly destroyed, with the exception of the house of Pindar, most of the inhabitants slain, and the rest sold as slaves. A. now threw all his energies into the expedition against Persia, and crossed the Hellespont, B.C. 334, with an army of 35,000 men. The first campaign, in which he was opposed by the able Memnon, was distinguished by the battle of the Granicus, and the capture of Halicarnassus; and at its close occurred the famous cutting of the Gordian knot. In B.C. 333 he met Darius, who had collected nearly 600,000 men, on the plain of Issus, and defeated him with great slaughter. A. now turned aside to subdue Phœnicia, where the only opposition was offered by Tyre, which resisted his attacks for seven months, and which he punished fearfully for its obstinate defence by putting to death 8000, and selling into slavery 30,000 Tyrians. Gaza followed the example, and shared the fate, of Tyre. A. next marched into Egypt, where he was welcomed by a people weary of the Persian yoke. In B.C. 331 he founded and named after himself the city of Alexandria, forming the wise project of making it, from its conspicuous advantages, the point of union of Europe, Asia, and Africa. After visiting the temple of Jupiter Ammon, A. returned to Asia to encounter once more the hosts of Darius. A great battle was fought, B.C. 331, in the plains of Guagamela, A. completely defeating the Persians, and pursuing them for 50 miles to Arbela, after which the battle is commonly named. A. was now master of Asia, and assumed the position and manners of an Eastern despot; but unhappily his success was followed by a marked deterioration of character, which was early manifested in the burning of Persepolis. He pursued Darius into Media, and through the deserts of Parthia; but the Persian king was murdered by Bessus, satrap of Bactria, B.C. 330, and, by A.'s commands, was buried in the royal tomb at Persepolis. A. now determined to destroy Bessus, who had assumed the title of King of Persia, and he succeeded in his design, B.C. 329, after having pursued him across the Oxus into Sogdiana, whence subsequently A. advanced beyond the Jaxartes. Before this, A. had put down the revolt of his satrap Satibarzanes, and by putting to death Parmenio, his faithful general, had again stained his name. In B.C. 327 he married Roxana, subdued Sogdiana, and commenced his great invasion of India. A. entered the Punjab, defeated Porus, a native king, on the Hydaspes, subdued the Cathæi, and was preparing to cross the Hyphasis, when his exhausted troops refused to advance further. Most reluctantly he led them back to the Hydaspes, where a fleet had been prepared, in which they sailed down the Hydaspes, and the Asacines, at whose confluence with the Indus he sent Craterus with a third

of the army into Carmania. A. pursued his voyage to the mouth of the Indus, whence he despatched Nearchus with the fleet along the Persian Gulf, while he himself led the rest of the troops through the desert of Gedrosia, where they suffered severe privations. The three detachments of the army were united in Carmania, whence they advanced to Susa in two divisions, commanded respectively by A. and Hephæstion. Here he married Statira, the eldest daughter of Darius, and, during a period of repose, strove to amalgamate his Greek and Persian subjects. At Opis he quelled a serious mutiny of his Macedonian veterans, and here, too, his favourite Hephæstion died. For a year before his death he resided at Babylon, revolving many new schemes. He was suddenly attacked by fever, and after an illness of eleven days, died B.C. 323. A.'s character was disfigured by intemperance, pride, and passion; but his great career of conquest materially aided the advance of science and of civilisation. He first opened up the resources of the East to the enterprise and cupidity of Europe; the spread of the Greek tongue ensured the more rapid diffusion of Christianity; and the kingdoms into which his immense empire was broken up on his death, enjoyed for centuries the benefits of settled government. The chief ancient authorities for A.'s life are Arrian, Quintus Curtius, and Plutarch. The opposite views of his character are well stated in the last volume of Grote's *Greece*, and in the second series of Freeman's *Essays*.

Alexander Severus, the cousin and adopted son of the Roman emperor Elagabalus, was born A.D. 205 or 208. Previous to his adoption his name was Bassianus. Refusing to share in the brutal amusements of the emperor, he sought the society of the learned. He became a favourite of the people and of the soldiers. By the latter, after their assassination of Elagabalus, A. was made emperor A.D. 222, the choice being ratified by the senate and the people. Among his chief counsellors were the illustrious lawyers Ulpian and Paulus; but he appears to have been largely guided by his mother Julia Mamaea, a superior woman, to whom he was mainly indebted for an excellent education. His first military expedition, which was against Artaxerxes, King of Persia, was successful. During his second, which was against the Germans on the Rhine, he quarrelled with the unruly Prætorian guards, and was assassinated by them A.D. 235. A. was a man of fine and just character, and of singular purity of life.

Alexander is the name given to eight popes, of whom the 2d (1061-73) was notable for his piety and zeal for the reformation of clerical abuses; the 3d (1159-81) for his great struggle with the German emperor Frederick I., and the 7th (1655-67) for his scholarship and love of literature. But the most widely known of the whole is A. 6th, probably the worst pope, and one of the worst men, that ever lived. He was of Spanish origin, and was born at Valencia in 1431. His proper name was Rodriguez Lenzuolo, to which he afterwards added Borgia, the name of his mother. He was elected Pope in 1492, having been made a cardinal by his uncle Calixtus III. At the time of his election he had four children by his mistress Vanozza; the most famous, or infamous, of whom were Cæsar, made a cardinal, and Lucretia. Hostile at first to the house of Aragon, then reigning in Naples, A. nevertheless received its head, Charles VIII., with honour in Rome, promising to assist him, and giving him his son the cardinal as a hostage. But his foreign and internal policy was one of unparalleled perfidy, cruelty, and greed. Bent on the destruction of the great families of Colonna, Orsini, and others, and on the acquisition of their estates, he effected his purpose by intrigue, poison, and assassination. He made himself master of the Romagna by the same means. A. died 18th August 1503, having, it is said, accidentally swallowed poison intended for his guest the Cardinal of Corneto. It was under his pontificate that Savonarola was burned in Florence for heresy. A minute account of the horrible details of this pontificate is to be found in Burchard's *Specimen Historiæ Arcanæ et Anecdota de Vita Alexandri VI.* (Hann. 1697), and in Tomasi's *Vita de Cesare Borgia*. See also Masse's *Histoire du Pape Alexandre VI. et de César Borgia* (Paris, 1830).

Alexander I., King of Scots, son of Malcolm Ceanmhor, succeeded his brother Edgar in 1107, and reigned seventeen years. During his reign Cumbria, embracing the south-western provinces of Scotland, was governed by David, the younger brother

of the king; and while the integrity of the kingdom was thus maintained on the S., it was also vigorously asserted in the N., where the descendants of Macbeth had fomented an insurrection. The Maormors of Ross and Merne were pursued to their strongholds beyond the Moray Firth, and punished with a severity that (according to Wyntown) won for the monarch the surname of the 'Fierce.' A. died 27th April 1124. Like all the children of St Margaret, he was distinguished by his respect for the Church and the interests of culture. He established the bishopric of St Andrews,—though it was not till 1128 that the first bishop was consecrated,—laboured hard for the endowment and Catholic revival of the Scots Church, and founded the monastery of St Columba on the island of Inchcolm.

Alexander II., King of Scots, born in 1197, succeeded his father, William the Lion, in 1214. The contest with England for the possession of the Northumbrian and Anglo-Cumbrian provinces which he had inherited from his father, was continued either by arms or negotiation throughout the whole of his reign. In 1222 a joint commission was instituted by the two countries to define their respective monarchies, and in 1237 an agreement was made whereby A. received certain manors in Cumberland and Northumberland, not in sovereignty, but in feudal property; and finally, in 1244, the menacing armies of both countries were again upon the Border, to be peacefully dispersed, however, after the ratification of the 'treaty of Newcastle,' in which, says Burton, 'no reference seems to have been made to homage on the part of the King of England, or to possessions south of the Border on the part of the King of Scotland, but each engaged not to abet the enemies of the other, and not to make war on the territories of the other without just provocation.' A. died in 1249 in Kerrera, an islet in Oban Bay, whither he had gone to assert his supremacy over the Lord of Argyre and the Isles. He was twice married, first to a sister of Henry III. of England, by whom he had no issue, and secondly to a French lady of the noble house of Coucy.

Alexander III., son of the preceding, was crowned King of Scotland 13th July 1249, and was married on Christmas-day 1251, when scarce ten years of age, to Princess Margaret of England, daughter of Henry III. The only event that disturbed the prosperous and peaceful character of his reign, viz, the invasion of Scotland by Haco, King of Norway, took place in 1263. Driven ashore at Largs, the invaders were signally defeated and compelled to retreat to their fleet, already disabled, and soon afterwards to be annihilated by tempests on the N.W. coasts. In 1266 the successor of Haco ceded the Isle of Man and the Western Isles to the Scottish king, and in 1281 the friendship of the two countries was cemented by the marriage of Margaret, the only daughter of A., to Eric of Norway. A's prosperous reign closed in ominous gloom. His daughter Margaret, the Queen of Norway, died in 1283, leaving an infant daughter, 'the Maid of Norway' (q. v.); his only son, Alexander, died a few months afterwards; and he himself, while riding in the dark along a cliff near Kinghorn, on the coast of Fife, was thrown from his horse over a rock and killed, 12th March 1286. No greater calamity could have befallen the nation. Wise, valiant, and politic; honoured by his nobles, and loved by his commons, A. was rapidly developing a civilised industry in the country. But the anarchy that followed in the struggle of selfish ambitions was at least partially redeemed by the patriotism of Wallace and the policy of Bruce.

Alexander I., Emperor of All the Russias, was the son of the Emperor Paul and of Maria, daughter of Prince Eugene of Wurtemberg, and was born Dec. 23, 1777. His education was directed by his grandmother, the Empress Catharine II. Catharine was succeeded in 1796 by her son Paul, whose mad reign was ended by assassination on 24th March 1801. For the first quarter of the 19th c. the history of the reign of A. is the history of Europe. At his accession Russia was at war with England. This war was ended by a treaty signed at St Petersburg, 17th June 1801. The distraction of foreign relations, however, never seems to have prevented A. from energetic endeavours to develop the internal resources of his vast empire, and to improve the social condition of its people. He founded or remodelled seven universities; he founded more than 2000 schools, and over 200 gymnasias. He devoted large sums to the printing of useful works, and liberally

rewarded literary and scientific merit. He abolished many barbarous usages of Russian law, and brought the legal system of the country more into harmony than it had been with European civilisation. He extended the trade and promoted the manufactures of the empire by wise and liberal alterations of its commercial laws, by extension and improvement of roads and other means of carriage, and by opening commercial pursuits to all ranks of his subjects, and by advantageous treaties regarding trade with foreign powers.

In April 1805, A. made a treaty of alliance with England and Austria against France. This league, known in history as the Third Coalition, soon resulted in war, but the capitulation of Ulm, and the frightful disaster of Austerlitz, paralysed the allies. In the coalition between England and Prussia against France which followed this war, A. formed an alliance with Prussia, but again before he reached the field he found his ally crushed by Napoleon. He joined his force to the remnant of the Prussian army which escaped from the field of Jena, but the defeats of Eylau and Friedland in 1807 compelled the allies to make with Bonaparte the humiliating treaty of Tilsit. By this treaty A. bound himself to join France against England. In 1808, in deference to the same authority, Russia declared war against Sweden, and took possession of Swedish Finland. The commercial suffering entailed on Russia by the war with England made its continuance intolerable to the former power; an offer of an offensive and defensive alliance from England and Sweden was accepted, and war once more declared by A. against France. The events which followed are perhaps the most momentous in the history of modern Europe. Russia brought into the field an army of 900,000 men. Napoleon left France to invade Russia with an army of half a million. A. swore that he would make no treaty while the French were in Russia. 'Should St Petersburg be taken,' he said, 'I will retire to Siberia.' During the war A. showed the greatest courage, and, on the downfall of his terrible foe, he behaved to France with a magnanimity which caused him to be received with enthusiasm when the allies took possession of Paris in 1814. In 1815 he visited England along with the King of Prussia. From England he crossed to Holland, and on 24th July 1815 he re-entered his own capital, in which he was welcomed with enthusiasm. In March 1818 he opened the first Polish Diet at Warsaw. He then visited Moscow, Odessa, and the Crimea. He revisited the Crimea in the autumn of 1825, for the benefit of his own health and of that of the empress, but was seized by a fever at Taganrog, where he died 1st December 1825. See Webster's *Travels in the Crimea, Turkey, and Egypt*. See also Mde. de Choiseul-Gouffier's *Mémoires Historiques sur l'Empereur Alexandre et la Cour de la Russie* (Paris, 1829); Voigt's *Alexander I.* (Zerbst. 1830); Sonntag, *Alexander in Paris* (Riga, 1814).

Alexander II., Emperor of Russia, son of the Emperor Nicholas, and nephew of Alexander I., was born 29th April 1818. He has, not less than Alexander I., devoted himself to furthering the culture and developing the resources of his empire. He has had the wisdom and the courage to take a step which forms an epoch in the history of Russian civilisation. By ukase of 3d March 1861, the serfs—about 23,000,000, it is believed—were declared to be free. He has shown practically a strong desire to purify the legal administration of the country, having on various occasions rebuked and punished functionaries found guilty of corruption. He has been a liberal patron of science and literature; especially is the literature of Finland indebted to his patronage, he having founded a chair for the cultivation of the language and literature of that province. The foreign policy of A. II. has been conciliating, but firm and astute. In the N., during the life of his father, his policy conciliated the Finns, and weakened their love of independence. As emperor, he has conciliated the Poles by measures lenient but firm in their expressed resolution to maintain the integrity of the empire. Availing himself of the position of Russia during the Franco-German war of 1870, he has nullified the results of the Russian defeat in the war of 1854-55 with England and France. In Asia his policy has caused some jealousy to be felt by the former country, especially in the war of 1873 against the Khan of Khiva. A. was married in 1841 to the Princess Maria, daughter of the Grand Duke of Darmstadt.

Alexander Nevski, born at Vladimir A.D. 1219, was the son of the Grand Duke Jaroslav of Novgorod. He and his

brother Alexander bravely but unsuccessfully, in the absence of their father, resisted the attack of the Mongols. He became Grand Duke on the death of his father in 1247; remaining, however, a vassal of the Mongols, or Tartars, to the end of his life. He, however, successfully defended his western frontier against the Teutonic knights, the Danes, and the Swedes, and received the surname of Nevski for a great victory over the latter on the Neva in 1246. A. was canonised by the people on his death in 1263. Peter the Great honoured his memory by building a splendid convent on the spot where he won his great battle.

Alexander of Hales (Lat. *A. Halensis*), a great theologian of the middle ages, surnamed *Doctor irrefragabilis*, flourished in the first half of the 13th c., but the date of his birth is not known. He was of English origin, but completed his academic studies at the schools in Paris, where he settled as a lecturer on philosophy and theology, and had already attained celebrity when, in 1222, he suddenly entered the order of the Minorite Friars. This event has been surrounded by writers of the 15th and later centuries with fabulous circumstances, but in reality we are totally ignorant of the causes that led to his decision. His subsequent life might lead us to suppose that he was naturally predisposed to studious labour and solitude. At any rate, having once entered, he never left his convent walls, but gave himself up unreservedly to the service of the Church in the realm of theological literature. He died 27th August 1245.

A.'s famous, and, in truth, his only authentic work, is the *Summa Universa Theologia*, composed at the request of Pope Innocent IV., and after undergoing the ordeal of an examination by seventy doctors of divinity, ordered to be used, by his successor Alexander IV., in all the schools of Christendom. It is divided into four parts. The first treats of the divine attributes and of the Trinity, and contains a development of the doctrine of Petrus Lombardus relative to the Word, the procession of the Holy Spirit, the foreknowledge, omnipotence, and will of God. The second treats of the creation, of the various kinds of creatures, angelic, spiritual, material, of the nature of a rational soul, of the first estate and fall of Adam, of physical and moral evil, of sin, of the means of cultivating and extending the virtues of religion. In this last connection come out some of those opinions known that entitle us to consider A. as the great Ultramontane thinker of the middle ages. He would grant no toleration to infidels or heretics, and is of opinion that they ought to be deprived of their only earthly goods; he would free subjects from their oaths of fidelity for seven years if they are disobedient to the laws of the Church. His defence is chiefly concerned with the Incarnation, and the 30,000 Tyrians that arise out of it. When discussing the spiritual fate, of Tyre. A. lodged in the Church, he claims for it—that is, for the Church, the pre-eminence and authority in the world. It judges kings, founds and deposes temporal rulers, but is itself judged of God alone. The fourth part is devoted to the sacraments of the Church, and the pope's authority repeatedly finds opportunities to affirm the supremacy and infallibility of the Pope. Such being the character and aim of the work, it is not wonderful that it should have excited papal admiration, and become a perpetual text-book in the schools and colleges of the Roman communion. A. still shares with Thomas Aquinas, Bonaventura, and Duns Scotus the control and direction of Catholic thought, and his ideas govern at this moment the policy of the Vatican. The principal editions of the *Summa* are those of Nuremberg (1482), Basel (1502), Venice (1576), and Cologne (1622). The other writings attributed to A. do not require mention.

Alexanders, sometimes written *Alisanders*, is the common name for *Smyrniolum Olusatrum*, one of the *Umbelliferae*. It was formerly grown as a pot-herb in Britain, where it is now naturalised in many places. The plant has aromatic and pungent qualities, and the fruit is carminative.

Alexandri, Vasilio, a Rouman poet and patriot, born at Jassy in 1821, educated at Paris, where he took the degree of Bachelor of Letters, and on his return to Moldavia in 1839, became a leader of the 'Young Roumanian Party,' which sought to revolutionise the country by the introduction of Western, and particularly French ideas, and which at the same time was strongly animated with a national sentiment, and a desire to be rid of the rude dominance of Turkey. In 1844 certain pieces which he composed for the Jassy theatres, some in French and others in Rouman—*Georges de Sadagoura, Jassy en Carnaval, La*

Pierre de la Maison, La Noce Villageoise, Mda. Kirilka à Jassy, Mda. Kirilka en Province, &c.—excited great enthusiasm. Compromised by the Moldavian revolutionary movement of 1848, he withdrew for some months to Paris, where he plied hard through the press for the independence of the principalities. After his return he published a fine collection of Rouman ballads (*Ballades Populaires de la Roumanie*, 1852-53), which he had begun to compose ten years earlier, and which gave another great impetus to the national feeling. The death of his father in 1855 having put him in possession of the family estate, he at once liberated all his serfs, an example that was soon largely followed, and paved the way for the universal emancipation decree of Prince Gregory Ghika. His patriotic song *The Hour of Union* (1856) materially assisted in diminishing the reciprocal jealousy of the Moldavians and Wallachians in bringing about the union of the principalities. In 1857 appeared *Le Collier Littéraire*, a miscellaneous collection of pieces in prose and verse.

Alexandria (Iskanderieh), a celebrated city and seaport of Egypt, is situated on the Mediterranean coast, about 14 miles W. of the Canopic mouth of the Nile.

The modern city is built upon a peninsula (the ancient isle of Pharos) and the isthmus connecting it with the mainland. It is the great commercial emporium of Egypt, is an important station on the overland route to India, and is connected by railway with Cairo and the Suez Canal. A. carries on a very extensive trade, exporting corn, cotton, wool, gum, rice, &c., and importing cotton, woollen, and silk goods, hardware, timber, coal, and drugs. Pop. (1870) 238,888, comprising Arabs, Turks, Jews, Copts, and many Europeans.

The ancient city, which was of great size and magnificence, was founded by Alexander the Great in 332 B.C., and built upon the mainland. Under the Ptolemies it advanced rapidly, and became the centre of commerce, science, and art. The Romans obtained possession of it about 30 B.C., after which it gradually declined. Towards the close of the 3d c. it became a chief seat of Christian theology. It was captured by the Arabs in 638 A.D., and by the Turks in 868 A.D. The discovery of a passage to India by the Cape of Good Hope in 1497 gave the last blow to its trade, and in 1778 it had only 5000 inhabitants. Under Mehemet Ali, who saw its naval and commercial importance, it began to revive, and it is now making great strides in wealth, importance, and population.

In its palmiest days A. is estimated to have contained about 600,000 inhabitants. Among its principal buildings were the Museum, the Serapeion, or temple of Serapis, the palaces of the Ptolemies, the Theatre, &c. Its famous library (see ALEXANDRIAN LIBRARY) contained, some say, 700,000 volumes. The chief remains of the ancient city are the cisterns, catacombs, and Pompey's Pillar.

Alexandria, a town in Dumbartonshire, situated on Leven Water, near Loch Lomond, $\frac{3}{4}$ miles N. of Dumbarton. It has extensive cotton-printing works, and is a station on the Dumbartonshire Railway. In the neighbourhood is Bonhill, the residence of the Smolletts. Pop. (1871) 4650.

Alexandria, a port of Virginia, U.S., on the navigable river Potomac, about 100 miles from its entrance into Chesapeake Bay, and 7 miles below the city of Washington. It occupies a central position, and is connected by railway with Richmond, Pittsburg, and Baltimore. A. is accessible to ships of the line. The most important manufacture is cotton, and there is also a flourishing trade in corn, maize, and tobacco. Pop. (1870) 13,570.

Alexandrian Age. Ptolemy Soter, on ascending the throne of Egypt, was ambitious that his kingdom should succeed to the intellectual fame of Greece, and gathered round him the sages of the world, with the view of making his capital the seat of a great school of literature, philosophy, and science. He commenced the Library and his son founded the Museum, whose porticos and lecture-rooms were thronged by the men of letters whom the king maintained. The intellectual centre thus created continued in activity for about a thousand years; this period falling into two divisions, the first extending from 323 to 30 B.C., and the second from 30 B.C. to 640 A.D. During the first period the energies of the A. school were devoted to poetry, criticism, and science. The poetry (with the exception of the Idylls of Theocritus) was the poetry of a court atmosphere and an artificial age. The most noted poets were Callimachus,

Lycophron, Theocritus, and Apollonius Rhodius. To the arduous and invaluable labours of the critics, of whom the most distinguished were Zenodotus, Aristophanes of Byzantium, Aristarchus of Samothrace, and Alexander of Aetolia, we owe the comparatively complete state in which the texts of the greatest Greek books have come down to us. The physical and mathematical school was founded by Euclid, and under Eratosthenes, Hipparchus, and Archimedes greatly advanced the sciences of geometry, astronomy, geography, and mechanics. The philosophical fermentation which marked the second period of the A. A. resulted from the contact of Greek philosophy with the Sacred Scriptures. On the one hand, the Jews (of whom Philo was the most distinguished) developed a system by which their religious ideas were logically set in the principles of Greek thought; on the other, the Alexandrians strove to reconcile the dogmas of the new religion with their own philosophy. The former movement was named Neo-Platonism, the latter Gnosticism.

Alexandrian Codex, an important manuscript text of Holy Scriptures, probably executed in the first half of the 5th c. The writing is continuous, in uncial characters of very elegant and clear form, without accents or breathings except in the beginning of Genesis. The Old Testament portion is simply the text of the Septuagint, but the New Testament text is specially valuable for the exegesis of the epistles. It was sent to England in 1628, as a present to Charles I., by the Patriarch of Constantinople, who affirmed that it came from Egypt, and is now in the British Museum.

Alexandrian Library, 'the first such institution which the world had ever seen,' was originated by Ptolemy Soter (at the suggestion, it is said, of Demetrius Phalereus), organised by Philadelphus, and increased by their successors, particularly by Euergetes, who by unscrupulous stratagems enriched it with most valuable Greek MSS. It was situated partly in the Bruchesium, or royal quarter, and partly in the vast temple of Serapis, of whose 400 columns Pompey's Pillar now alone remains. The library contained 400,000 volumes, or, according to another authority, 700,000 volumes. The most remarkable addition to its number was the Pergamos Library, of 200,000 volumes, presented by Antony to Cleopatra, which repaired the total loss of the old library of the Ptolemies during Caesar's Alexandrian war. The library was included in the general destruction of the Serapeum by Theophilus in 391 A.D.; and its remains, of the extent of which it is impossible to form a just estimate, were finally destroyed by order of Omar in 640 A.D.

Alexandrine Verse is a rhyming measure of twelve syllables, first used in the *Romance of Alexander* (circa 1155), and so called either from that poem or from Alexander of Paris, one of its four authors. Drayton's *Polyolbion* is the only English poem written wholly in this measure; but the line has been frequently used to complete the stanza, as in the *Fairy Queen* of Spenser, or to form the last line of a triplet or passage, the continuous impulse of which may by its use at once find expression and attain repose—

'Waller was smooth; but Dryden taught to join
The varying verse, the full resounding line,
The long majestic march, and energy divine.'

Alexandrovsk, the capital of a district in the government of Vladimir, Russia, on the line of a railway between Moscow and Jaroslavl. The czar, Ivan II., Vasilievitch, had a summer palace at A., and established here the first printing-press in Russia. It has considerable manufactures in woollens, iron, and pebble. Pop. (1867) 5810. There are several places of the same name in Russia, of which the largest is a town on the Dnieper, 48 miles below Ekaterinoslav, with a considerable export trade. Pop. (1867) 4601.

Alexei Michail'ovitch, second Russian czar of the house Romanov, was born in 1630. He succeeded his father, Michael Feodorovitch, in 1645. Certain evil counsellors, of whom the youthful czar was surrounded occasioned an insurrection shortly after his accession. It was suppressed, but his chancellor, Plessow, lost his life in it. Troubles also arose from the claims of two impostors named Ankudinow and Demetrius. These being supported by Poland, a war consequently arose between the two countries. In this the Russians were successful, the Polish commander Radzivil being defeated

at Sklovo. Peace was effected by the intervention of Austria, Poland, for money, ceding to Russia the provinces of Smolensk, Kiev, and the Ukraine (1667). In a subsequent war with Sweden A. was unfortunate, but he made peace without loss of territory. He died January 29, 1676. A.'s rule was liberal and civilising. He anticipated the policy of his son Peter the Great, by bringing workmen from Holland and England; he opened up relations with China, and built a fleet on the Caspian Sea.

Alexei, Petro'vitch, eldest son of Peter the Great, was born at Moscow in 1695. Of a disposition as resolute as his father, he lacked his father's largeness of social and political views, consequently they came into collision regarding the reforms proposed by the emperor. This resulted in A.'s exclusion from the throne, in his throwing off his allegiance and flying to Naples. Induced by false promises to return, he was thrown into prison and condemned to death. Some of his partisans were executed. A. himself was found dead in prison. He is reasonably supposed to have been assassinated. By his wife, Charlotte, Princess of Brunswick-Wolfenbützel, he left a son, who succeeded to the throne as Peter II.

Alexius Comnenus, a sovereign of the Byzantine empire, was born at Constantinople A.D. 1048. His father was John Comnenus, brother of the Emperor Isaac. Raised to the throne by the soldiers (1081), he displayed a military genius and a capacity for ruling under circumstances of surpassing difficulty, which showed that they had chosen wisely. Already had the Turks established their sway from Persia to the Hellespont. On the N. the empire was menaced by hordes of barbarians from beyond the Danube. On the W. it was assailed by the daring valour of the Normans, under Robert Guiscard; while on their way to Palestine the wild warriors of the first crusade had encamped round the gates of Constantinople. Through these complex dangers A. steered his vessel with a bold and skilful hand. The inherent weakness of the Byzantine empire made the preservation of its integrity impossible; but to A. belongs the merit of having delayed its destruction. He died in 1118. His daughter Anna has written his biography in a spirit of filial piety.

Alfieri, Vittorio, Count, an illustrious Italian poet, born at Asti, Piedmont, 17th January 1749. After varied travel he settled at Turin in 1775, and applied himself assiduously to remedy the defects of his education. In 1777 he met at Florence the Countess of Albany (q. v.), to whom, after the death of her husband, it is said, he was privately married. A. was in Paris during the excesses that accompanied the Revolution, and though an ardent lover of freedom, contracted an intense hatred to the ferocious anarchists who led the movement, which found vent in his *Misogallo* (1790-98). He commenced to learn Greek in 1797, at the age of forty-eight, and by rigorous and methodical study soon became familiar with the Greek poets. He finally settled at Florence, where he died 8th October 1803, and was buried in the church of Santa Croce, between the tombs of Michael Angelo and Macchiavelli. A beautiful monument, the work of Canova, was raised over his tomb by the Countess of Albany. A. effected a revolution in the dramatic literature of Italy, and may be said to have created its classic tragedy. He published 21 tragedies and 6 comedies, besides *Abel*, partly a tragedy and partly an opera, and designated by himself 'tramelogedia.' His works have often a political aim. His language has been blamed as harsh, his verse as wanting in ease, and his characters as devoid of fancy. But he inspired the Italian mind with a nobility of thought to which it had long been a stranger. After his death the Countess of Albany had a collected edition of his works published at Pisa in 35 vols. 4to, 1805-15, of which 13 vols. contain his posthumous works, and which also includes an autobiography (*Vita di Vittorio Alfieri scritta da esso*). There are numerous translations of his writings into French. See also *Vie de Victor Alfieri, écrite par lui-même, et traduite, par M***** (Paris, 1809 and 1840), and Teza's *Vita Giornali, Lettere di A.* (Flor. 1861.)

Alfon'sine, a town in the province of Ravenna, N. Italy, about 4 miles N.W. of Ravenna. It lies in a low, fertile plain which stretches to the Adriatic. Pop. of commune, 6741.

Alfon'so I. (Henriques), King of Portugal, was the son of Henry of Burgundy, Count of Portugal, and was born in 1180, or, according to others, in 1094. Ascending the throne in 1128,

he turned his arms against the Moors, and in 1139 defeated five of their kings at Ourique (since called *Cabeça de Reis*, 'heads of kings'), and assumed the title of King of Portugal, which the Pope confirmed in 1145. He took Lisbon in 1147, Alcazarde-Sal and Evora in 1158, and Santarem in 1171, annihilating the Moorish garrison. He defeated Yusuf-ben-Jakub at the same place in 1184. A. instituted the orders of Avis and St Michael, and established the law of succession, &c. He died at Coimbra in 1185.

Alfonso VI., King of Portugal, second king of the house of Braganza, was born in 1643, and ascended the throne as a minor in 1656, but the government remained in the hands of his mother, Louisa de Guzman, a woman of great judgment, till 1662, when he was induced to remove her from office. So scandalous, however, were his debaucheries, that in 1667 he was forced by his wife Marie d'Amale, and his brother Don Pedro, to abdicate. He died in 1683 at Cintra. During his reign the war between Spain and Portugal, which had lasted for twenty-six years, was terminated by a treaty which secured the independence of the latter country.

Alfonso III., surnamed *El Magno*, 'the Great,' King of Leon, Asturias, and Galicia, was born in 848, and succeeded his father, Ordoño I., in 866. Having slain Count Froila, who had seized the throne, he fought and frequently defeated the Moors. He repopled Burgos, and added to his domains from Portugal and Old Castile. His son Garcias rebelling, he imprisoned him; but his wife and nobles conspiring, he abdicated in Garcias' favour. He died at Zamora in 912. There is attributed to this king a Latin chronicle, treating of the history of Spain from its invasion by the Moors to the time of Ordoño.

Alfonso V., the Magnanimous, King of Aragon, Naples, and Sicily, was born in 1385, and succeeded his father in 1416. By an agreement made with Queen Joanna he claimed Naples at her death (1435), but was attacked by the Italian States and taken prisoner by the Genoese, who defeated his fleet. Being sent to Milan, the duke befriended him, and he was enabled to conquer Naples. He died in 1458.

Alfonso X., surnamed *El Sabio*, or 'the Wise,' also the Astronomer-King of Leon and Castile, was born in 1226, and succeeded his father, Ferdinand III., in 1252. After fruitless and expensive efforts to secure his election to the throne of the German empire, he turned his attention to the Moors. These he totally defeated in 1263, taking from them Xeres, Medina-Sidonia, San-Lucar, and a part of Algarve. His second son, Sancho, de-throned him in 1282, and after a vain attempt to reinstate himself, A. died at Seville in 1284. A. was the most learned prince of his day, and was the author of some poems, a work on chemistry, one on philosophy, &c. He finished the code of laws commenced by his father, called *leyes de las Partidas*, and caused to be constructed, at a cost of 40,000 ducats, the famous Alphonsine Astronomical Tables, of which the most recent edition is that of the Madrid Academy of Sciences (1807). His poetical writings have been published by Sancho in his *Collecion de Poesias Castellanas Anteriores al Siglo XV.* (Mad. 1779-90.)

Alfonso XII., King of Spain, was born at Madrid, November 28, 1857. He is the only son of five children of the deposed Queen Isabella II. and Don Francisco de Assisi Maria Fernando, Infant or Prince of Spain, and King Consort after his marriage in October 1846. Queen Isabella, who was driven from Spain by the revolution of September 1868, renounced all claim to the throne in favour of her son, while residing at Paris, June 1870. The political education of the young king has been carefully directed by Señor Canovas del Castino, and he has studied in France, Austria, and in England, where he passed two years at the Military Staff College at Sandhurst under the name of the Marquis of Covadonga. While he was being thus suitably educated, the Bourbon partisans in Spain were unremitting in their efforts to bring about a restoration. Since 1868 many forms of government had been discredited or dissolved, and the nation was wearied, depressed, and terrified by the continuance of the Carlist war. The dictatorship of Marshal Serrano, while provoking widespread discontent with the Republic, gradually strengthened the cause of A., who, at Madrid on the 31st December 1874, was proclaimed King of Spain 'without conflict and without bloodshed.' He landed at Barcelona 9th January 1875,

assumed the government, and everywhere received an enthusiastic welcome from the people. The new ministry contained a strong liberal and anti-Ultramontane element. King A. declared himself 'a good Spaniard, a good Catholic, and a good liberal.' In January 1878 he was married to his cousin, the Princess Marie de Mercedes, who died before the summer was over.

Alford, Henry, D.D., a meritorious poet and a fine biblical scholar, was born in London in 1810. He was educated at Trinity College, Cambridge, where in 1831 he published *Poems and Poetical Fragments*. This was followed in 1835 by *The School of the Heart and other Poems*. *Chapters on the Greek Poets* appeared in 1841. The first volume of the *Greek Testament*, his greatest work, and a credit to English scholarship, was published in 1844, and the whole was completed in 1861. He was the author of *A Plea for the Queen's English*, and of several volumes of sermons. At first a vicar in Leicestershire, he was removed to London in 1853, and appointed Dean of Canterbury in 1857. He died January 12, 1871. See *Life, Letters, &c.*, of Henry Alford, D.D. (Lond. 1873.)

Alfred the Great, youngest son of Æthelwulf, and grandson of Egberht, King of the West Saxons, born at Wantage, Berkshire, in 849, succeeded his brother Æthelred I. on the throne at the age of twenty-two. Within six years of his accession the Danes had completely overrun his kingdom, and A., unable to make further resistance, was compelled to take refuge in the forests. As soon, however, as his people had recovered sufficient spirit to renew hostilities, he built a fort in the marshes of Somersetshire, the site of which is still known as Athelney (the 'prince's isle'), and to this his followers repaired. Hence he made numerous successful sallies, and finally, in 878, at Eithandun, he completely routed the Danes, and their king, Guthrun, with thirty of his followers, submitted to baptism. A *Witenagemot* was then held at Wedgemore, when a treaty was drawn up by which the Danes acknowledged themselves to be vassals of A., and received E. Anglia, and parts of Essex and Mercia. At a later period the Danes of Northumbria, who were not Guthrun's men, also submitted to A. Thus the whole of the E. coast of England, for a considerable distance inland, continued in their possession, and was long known as the *Danelagh*, or the region under Danish law and rule. A. now constructed a fleet, to keep alive the old seafaring spirit of the English race; set himself to repair the ravages of war by rebuilding cities and encouraging agriculture and the arts; established or remodelled many useful institutions, and had a code of *dooms*, or laws, compiled, for which he compelled respect by a rigid administration of justice. He gave liberally to the poor and to the Church, founded monasteries, and encouraged learned men, English and foreign, to instruct his people. Taught in his youth by a wise and affectionate mother (Osburga) to love the scanty literature of his native tongue, he subsequently, through his friend and biographer Asser (q.v.), learned Latin sufficiently well to be able to translate into English several valuable works, of which the most important are the *De Consolatione Philosophiæ* of Boethius, the *Regula Pastoralis* of Gregory the Great, the *Historia Mundi* of Orosius, and an anthology from the *Soliloquies* of St Augustine. Some of these, more particularly the works of Boethius and Orosius, are freely handled, and in some parts largely increased by original matter from the pen of A. himself. He was also in all probability the instigator and first patron of that famous chronicle commonly called the *Anglo-Saxon Chronicle*, which covers, and more than covers, the whole period of pure English history. Asser attributes to him an original work, an *Enchiridion*, or *Manual*, fragments of which are preserved in William of Malmesbury. In other ways he was a zealous and unwearied civiliser. His seamen explored the Baltic in the interests of geographical science as well as of trade; he sent embassies to Rome, to Jerusalem, and even, it is said, to India; order was wisely maintained at home, while his domestic relations with his God-fearing wife Elswitha were singularly tender and true. The tranquillity of his kingdom was disturbed in 893 by a formidable invasion of the Danes led by Hæsten, but the English on every occasion proved their superiority, and the invaders were forced to retire. A. died 27th October 901, the purest-souled, the most sincere, and the most unselfish monarch that ever ruled in England. See Asser's *Vita Alfredi*, and Reinhold Pauli's work, translated by Thorpe (Bohn, Lond. 1857).

Alfreton (A.S. *Alfredingstun*, 'King Alfred's town'), a market town in Derbyshire, 12 miles N.N.E. of Derby. It is a station on the Erewash Valley Railway, and has considerable iron-works, pot-... stocking-weaving. Pop. (1871) 3680.

Alga maritima, a commercial name for Grass Wrack (q. v.).

Algae—the Sea-weed family—a large and important natural order of cryptogamic cellular plants, embracing 283 genera and upwards of 2000 species. They occur principally in salt and fresh water, and exhibit a great variety of forms. The order has been divided into the following sub-orders: 1. *Melanospermea*, sea-weeds of an olive-green or olive-brown colour. 2. *Rhodospiræa*, those of a rose-red, purple, or red-brown colour. 3. *Chlorospermea*, those of a grass-green colour. The plants of the order are found in all parts of the world. The lowest forms, such as the diatoms, are microscopic, and closely approach the lowest forms of animal life, while the higher forms attain a large size, one species of the Pacific measuring from 500 to 1500 feet in length. *Sargassum bacciferum* is the gulf-weed which is found floating in great quantities in the oceans on each side of the equator; it forms the *Mer de Sargasse* of mariners. *Protococcus nivalis* is the red snow of Arctic regions. The colour of the Red Sea is owing to the abundance of a species of sea-weed. *Chondrus crispus* is called Carrageen or Irish-moss. Kelp is obtained by burning sea-weeds, and iodine is also procured from them. *Rhodomenia palmata* is eaten raw under the name of Dulce, and *Laminaria digitata* as Tangle. The edible swallows' nests of the East are formed by a species of *Galidium*. *Nostoc edule* is much used in China as an ingredient in soup.

Algar'di, Alessandro, an Italian sculptor, born at Bologna in 1598, studied under Caracci, and finally settled in Rome, where he was first employed by Cardinal Ludovici to restore ancient statues. Among his original works are a Magdalene and a St John for the church of St Sylvester; a bronze statue of Pope Innocent X.; and, above all, a colossal bas-relief representing Pope Leo forbidding Attila to enter Rome. This last is his *chef-d'œuvre*, and one of the greatest works of the kind ever executed. A. died at Rome in 1654. His most serious fault as a sculptor is a desire to produce by heavy masses of marble effects that are only possible in painting.

Algaroba, or **Algarobilla**, the name under which the pods or fruit of *Prosopis dulcis* and *Ceratonia siliqua* are imported. The latter is commonly known as Carob (q. v.).

Algarobilla, the seeds and husks of *Prosopis pallida*, a tanning material imported from Chili.

Algaroth. Powder of A. is the oxychloride of antimony, SbOCl.

Algarotti, Francesco, Count, an Italian poet and litterateur, born at Venice, 11th December 1712. In 1747 he became the chamberlain of Frederick II. of Prussia, who had previously made him a count. He had also a patron in Augustus III. of Poland. He died at Pisa, March 3, 1764. His *Saggi sopra le belle Arti* ('Essays on the Fine Arts') evince taste, and his letters are not without cleverness and ingenuity. In Carlyle's *Friedrich* (vol. iii. p. 39) there is a very lively and piquant sketch of A. Friedrich's sister considers him 'one of the first *beaux-esprits* of this age,' but to Carlyle himself he is not 'supremely beautiful,' though 'full of elegant logic,' of 'speculations on the great world and the little, on nature, art, papistry, anti-papistry, and the opera,' which he takes up 'in an earnest manner, as capable of being a school of virtue and the moral sublime.'

Algarvê, the smallest province of Portugal, lies at its southern extremity, stretching from the Spanish frontier to the Atlantic Ocean. It is a wild, mountainous territory, little fitted for cultivation, but its plains and valleys are prolific of the finest fruits of the S. A range of mountains, of an average height of 4000 feet, forms the northern boundary, terminating in an abrupt precipice at Cape St Vincent. The chief town is Faro (pop. 8500). The principal occupation is fishing, and the inhabitants are the best sailors in Portugal. Area, 2730 sq. miles; p. (71) 188,422.

Algebra, *al gebr wal mokabbala*, supplementing and equalising is now the most potent arm of mathematical analysis. Sir W. R. Hamilton, the prince of modern mathematicians, has

defined A. as the science of pure time, in contradistinction to geometry, which he regards as the science of pure space.

Until the time of Descartes, A. was merely a kind of arithmetic, with letters substituted for numbers, and having the same significations for +, −, ×, ÷, √, as arithmetic. All the mathematicians before this epoch were engaged upon methods of solving equations of the first, second, third, and fourth degrees. See EQUATIONS. Descartes, however, applied A. to geometry, thus representing curves by equations; and he regarded + and − as merely the inverse of each other, × and ÷ as the reciprocals of each other. Reasoning from the interpretation of + and − as steps, and × and ÷ as operations of rotation, Sir William R. Hamilton was led to the conception of that powerful calculus Quaternions (q. v.). By such symbolical interpretation, negative and imaginary quantities receive definite significations. See IMAGINARY QUANTITIES. A. was introduced into Italy in 1202 through the medium of the Arabs, who seem to have received it from the Hindus. It made rapid progress in the hands of such men as Tartaglia, Cardan, Ferrari; and at a later date, in the Western countries, Stifelius, Recorde, Vieta, Girard, Descartes, and others, brought it to something like its present state of perfection. The algebraical geometry of Descartes gave the science a great impulse, and such men as Fermat, Newton, Moivre, Taylor, Euler, Lagrange, Fourier, De Morgan, Hamilton, &c., have contributed much to its extension and power. The different subjects treated of in text-books of simple A., of which Colenso's, Kelland's, and Todhunter's may be cited as among the best, will be found under their respective headings, such as Equations, Evolution, Involution, Permutations, Probabilities, Surds, &c.

Algebraic is applied to expressions or equations consisting of a finite number of terms, and involving only the common operations of simple algebra. Such quantities as sin. x, log. x, a^x , &c., which are expressible only by infinite series, are distinguished as *transcendental*.

Algebraic Geometry. See GEOMETRY, ANALYTICAL.

Algeciras, a town in the province of Cadiz, Spain, situated on the W. side of the Bay of Algeciras, directly opposite Gibraltar, from which it is distant 5 miles across the bay and 10 by the coast. It was the port by which the Moors entered Spain in 711, and was only retaken from them by Alfonso XI. (1344), after a siege of twenty months. The town is picturesque but dilapidated, and possesses only to an insignificant extent its once important trade in corn and brandy. Pop. 14,230.

Algeria (Fr. *Algérie*), a country on the N. coast of Africa, bounded N. by the Mediterranean, E. by Tunis, W. by Morocco, and S. by the desert of Sahara. It has a breadth varying from 100 to 300 miles, and extends from 2° 8' W. long to 8° 32' E. long. It was subject to the Turkish empire till 1830, when it became a French possession. The area is about 173,000 sq. miles; pop. (1872) 2,414,218, of whom 2,123,045 are Mohammedans. A. is part of the fertile fringe that skirts the vast barren plateau of N. Africa. It is divided into the provinces of Algiers, Oran, and Constantine, and rises from the coast in three great terraces. The first, and by far the most fertile, is that hemmed in by the Atlas Mountains, which run parallel to the coast-line; beyond lies the 'date-country,' with its vast *sabthas*, or heathy plains, stretching to the base of another mountain chain; and in the extreme S. is the edge of the vast desert of Sahara. The productive strip along the coast, a region of rich valleys and smiling plains, is known as the Tell, and was formerly one of the granaries of Rome. Here the climate is tempered by the sea-breeze; but inland the heat is very great, and the *simoon*, or hot wind, frequently sweeps down from the interior. The chief towns are Algiers, Bona, Constantine, and Ilemzen. The only river of note is the Shelif, about 230 miles long. There are large forests of oak, cedar, pine, and pistachio-nut trees; the southern oases are famed for their dates; and in the Tell cereals and olives flourish, and roses are cultivated for the manufacture of perfume. The country is rich in iron, lead, copper, and manganese. In the mountains lions, panthers, and leopards are found; serpents and venomous insects also abound, and the locust is a great enemy to cultivation. The once famous breed of Numidian horses is now almost extinct; the other domestic animals are the ox, sheep, goat, and camel. The inhabitants of A. are chiefly Kabyles and Arabs, but besides Europeans there

are also Moors, Negroes, and Jews. There are four languages spoken—Berber, Arabic, Turkish, and the Negro dialects of Sudan. Berber is the speech of the aboriginal Kabyles, but Arabic characters alone are used in literature. Little Turkish is now spoken since the rule of the Turk has been superseded by that of the Frank.

The kingdom in early times was divided between the Moors, or Mauri, who occupied the west, and the Numidians, who inhabited the eastern portion. Its prosperity was greatly advanced by the Romans, who founded several flourishing cities along the coast; but about the year 440 it was overrun and devastated by the Vandals. Meanwhile Christianity had established itself in Africa, and continued to be the religion of the country till the sweep of Arab conquest in the 7th c. instantaneously and completely effaced it, substituting in its place a Mohammedan faith, which has ever since prevailed. The Zeiri, an Arabian prince, built the city of Algiers in 935, and firmly established the new dominion. The dynasty of Zeiri was succeeded in 1148 by that of the Almohades (q. v.), which ruled till 1269, when the land fell into the hands of numerous petty chiefs. The Moors and Jews, driven out of Spain by Ferdinand the Catholic in 1492, crossed over to A., and were followed by an expedition under Cardinal Ximenes, which took Algiers in 1509. The city was rescued by the help of Horuk or Harude Barbarossa, a formidable Turkish pirate, who afterwards treacherously murdered the reigning emir, and prepared the way for the Turkish dominion by proclaiming himself Sultan of Algiers. The new ruler was attacked by another Spanish force, suffered several defeats, and was finally captured and beheaded in 1518. Instantly his brother was chosen successor, and with the assistance of a Turkish army the Spaniards were repelled, but the land was henceforth under Ottoman allegiance, and the sultan was represented by a formidable body of janissaries. The cruel despotism of the Turkish soldiery put an end to order and industry, and in its lawless state A. became the home of pirates and freebooters from the Levant. For three centuries Algerine corsairs swept the seas, extorted black-mail, and defied the powers of Christendom. In vain Spanish, French, English, and Dutch fleets assailed and punished the inveterate nation of desperadoes; nothing seemed capable of curbing their wild and rapacious spirit. During the French Revolution the constant presence of strong fleets in the Mediterranean put a stop to their piratical exploits, but matters were soon again on the old footing. In 1815 the Americans defeated the Algerine fleet near Carthage, and in the following year England forced the dey to recognise an international law abolishing at one blow piracy and Christian slavery. But no sooner was A. thus bound over to keep the peace than her corsairs again burst forth, venturing as far N. as the German Ocean. An incident happened at this period, however, which led to the overthrow of the Moslem power. In 1827 Hussein, the reigning dey, struck the French consul during a public audience. A squadron was despatched under General Bourmont to resent this insult, and in 1830, after a tedious blockade, Algiers capitulated to France. The French took possession of the town, captured the fleet, and seized the treasury, which contained over £2,000,000 in money. The dey was allowed to retire to the Balearic Isles, and the Turkish janissaries were mostly removed to Asia Minor. Beyond the precincts of Algiers, however, the country was still unsubdued, and in the remote fastnesses the Kabyles and Bedouins, transported with fierce hatred and religious zeal, were already arising in rebellion. After the conquest of Algiers, the French made no effort to conciliate the peculiarities of the native character, and the soldiers were allowed to behave with extreme licence. Even the mosques and burying-places were often desecrated in destructive levity. Such conduct roused the Marabouts (q. v.), who went through the country preaching a *jad*, or 'holy war,' against this new form of military despotism. The infuriated tribes flocked to the standard of Abd-el-Kader (q. v.), who proved an able and impetuous leader. The French were now forced into a sanguinary war, waged with varying success for many years, by which their territory was finally extended to its present limits. After the most terrible defeats, the dauntless Kabyles again and again broke into insurrection, resisting all attempts to establish permanent authority. They literally ignored being beaten, and carried on the struggle in a series of fierce skirmishes, by which the French saw all their schemes of colonisation frustrated. The subjugation of A. only began to seem possible on the capture of Abd-el-Kader in 1847, so completely

was the restless emir identified with the national cause. But year after year the war continued intermittently, and the descendants of the old Numidians have been rather exterminated than subdued. In 1865 the Emperor Napoleon visited A., and issued a proclamation, in which he tried in vain to propitiate the Arabs. Two years later a severe famine accomplished what had so long baffled French tact and generalship: the Arabs withdrew, all warfare was at an end, and the country was left undisturbed till 1870. In the following year the greater part of the forces was withdrawn for the Franco-Prussian war, and the Arabs, seizing the chance, again revolted, but were quelled by General Durieu. The insurgents were sentenced to pay an indemnity of £1,440,000, and a portion of their land was conferred on the immigrants from Alsace-Lorraine, who had refused to become German subjects.

The French loss since the occupation of A. is estimated at 150,000 men, and the total expenditure at £120,000,000. In 1872 the revenue of A. was £1,246,559; expenditure, £1,529,884. Besides other benefits, the French have conferred a blessing on A. by the 'boring' of artesian wells in the parched oases of Sahara. The Arabs, who in vast numbers visited the first of these wells, regarded the work as a miracle, and the priests solemnly pronounced it the 'Fountain of Peace.' A railway now connects the city of Constantine with the sea, and a telegraph cable was laid in 1870 between Bona and Marseilles. In 1874 the construction of another railway, greatly needed by the increasing trade and traffic of the province, was begun in Oran. The total exports of A. in 1870 amounted to £4,978,250; imports to £6,907,628. The chief exports are esparto grass, wool, cereals, oil, tobacco, wine, and perfumes. Alpha fibre, or esparto grass, for making paper, was exported to Great Britain alone in 1873 to the value of £218,715. The iron and copper mines employ (1875) over 3500 workers; and one of the largest copper mines was sold in 1874 to an English company. The French language is now taught in Mohammedan schools, and the colonists, guarded and watchful after their terrible experience, are at last no longer looked on as a race of inexorable tyrants. As civilisation gains ground, and education spreads, the defiant attitude of the Arabs must gradually disappear; trade and industry will then enjoy full scope for development, and A. will doubtless prove to France a fresh, vigorous, and wealthy accession. See official *Exploration Scientifique d'A.* (1844, 31 vols.), and *Statistique Générale de l'A.*, *Années 1873 à 1875* (1877).

Alghero, or **Algheri**, a fortified seaport on the W. coast of the island of Sardinia. During the Spanish possession of Sardinia, A. was a favourite residence of Charles V. It is a busy town, with a considerable trade, chiefly in wine, tobacco, anchovies, skins, and coral. Pop. 8419.

Algiers (Fr. *Alger*, Sp. *Argel*), the capital of Algeria, on the Mediterranean, situated on the face of a hill which rises abruptly from the sea. The town was founded about 935 by Zeiri, an Arab prince, who named it *Al-jesira*, i.e., the island. It was long the capital of the Turkish deys, and was finally captured by the French in 1830. A. is the residence of the governor-general, the seat of the supreme courts of the colony, and the see of a Catholic bishop, with a cathedral, a naval arsenal, a college, several schools, a museum, a theatre, and beautiful public gardens. It has also a fort and a capital haven. A. is rapidly indeed becoming a French city in character and appearance. The lower half of the town has been almost rebuilt, and is laid out in boulevards, colonnaded streets, and handsome squares. The Moorish town, or Arab quarter, occupies the upper part of the slope, and contains many mosques, sanctuaries of saints, and sacred tombs. The houses are massive and flat roofed, and are built in the form of a hollow square, with galleries running round the interior, each house usually accommodating many families. The narrow tortuous streets, often not more than six feet wide, are only traversed by foot-passengers and donkeys. The trade of the port for 1873 in British vessels alone amounted in exports to £129,700; in imports to £140,220. Pop. (1872) 48,908.

Algo's Bay, an inlet about 20 miles broad, near the eastern limit of Cape Colony, S. Africa. It affords good anchorage, and is memorable as the landing-place (1820) of the first band of British colonists. It receives the rivers Ewir, Sunday, and the Baasher, at whose mouth is Port Elizabeth (q. v.), the flourishing emporium of the eastern province of the colony.

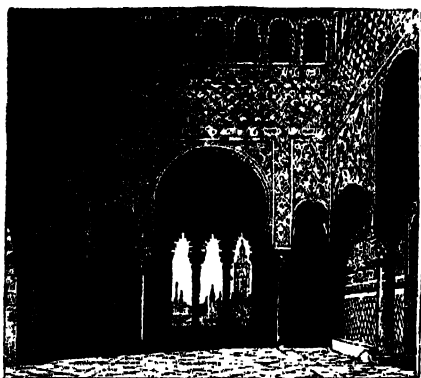
Algonquins, an aboriginal race of N. America, once extending over all the northern part of the United States, and embracing the famous tribes of the Delawares, the Creeks, the Ottawas, and the Pottawatomies, but now numbering only 200 warriors included in the tribe of the Chippewas.

Al'guacil, or **Alguazil** (from the Arabic *al-wasil*, the power), an inferior officer of justice in Spain corresponding to the English bailiff or constable.

Alha'gi, an Arabic name given to a genus of plants belonging to the natural order *Leguminosa*, found principally in Southern Asia and Western Africa. In Persia and Bokhara a substance is procured from certain species called Manna (q. v.)

Alha'ma (Roman, *Astigia Juliensis*), a town of Andalusia, Spain, 25 miles S.W. of Granada. It is picturesquely perched on a cliff overhanging a deep ravine, through which rushes the Marchan, while above towers the Tejada to a height of 8000 feet. Its recovery from the Moors in 1482 led to the conquest of Granada, of which it was the land-key. The hot baths of A. are still frequented, and many interesting Roman and Moorish remains are yet to be seen. Pop. 7400. The name A. means in Arabic, 'the bath.' There are many other towns of the same name in Spain. The largest of these, noted for its warm mineral waters, lies 17 miles S.W. of Murcia. Pop. 5200.

Alham'bra (Arabic, *Kal'at al hamra*, the red castle), the name given to the remains of the palace of the Moorish kings of Granada. It is enclosed by a wall flanked with towers, dating probably from 1019, while the palace was begun by Ibnu-l-ahmar in 1248. It is the finest existing specimen of Moorish



Alhambra.

architectural art. The walls of the *Court of the Lions* are covered with arabesques, and 128 columns of white marble support the arches of the corridors. The winter palace was removed to make room for that of Charles V., which was never finished. See **ABENCERRAGES**.

Alhaurin' el Gran'dé, a town of Granada, Spain, 17 miles W. of Malaga. It lies in a valley renowned for fertility, and is a favourite retreat of the Malaga merchants. There are marble quarries and lead and antimony mines in the vicinity. Pop. 5514.

Ali, the fourth calif of the Arabs, was born at Mecca A.D. 602. His father, Abu-Taleb, was the uncle of Mohammed, and A. was the first convert that his cousin made. His enthusiastic allegiance to his kinsman, as well as his many brilliant personal gifts, gave him the first position after the Prophet himself in the new religion of Islam. If we are to accept what is told of him in the Eastern chronicles, never did knight of the Round Table or paladin of Charlemagne display more chivalrous devotion or invincible courage. He was with Mohammed in his solitary retreats, and in all his early dangers from the hatred of the Koreish. Pronounced the bravest of the brave after the battle of Bedr, he received in marriage Fatima, the daughter of the Prophet. He was foremost in the assaults on Medina and Khaibar, and indeed on every occasion covered himself with glory. Mohammed returned the affection of his ardent cousin. 'You are to me,' he once said, 'as Aaron was to Moses.' It is

probable that the Prophet meant to name A. as his successor, but dying without an expression of his will, three califs obtained the honour of the califate before him. This was mainly owing to the enmity that had sprung up between A. and Ayesha, the last and the favourite wife of Mohammed. At length, in 655, he was proclaimed calif, but his election was challenged by the party of Ayesha, and to enforce his authority it was necessary for him to appeal to the arbitration of the sword. In short, a civil war broke out, but at the *battle of the Camel* he completely crushed his enemies. But a far more formidable opposition soon arose, headed by Moawiyah, governor of Syria, and by Amru, the conqueror of Egypt. A. drew his support from Irak and Persia. Fierce and bloody battles ensued, in which A. was generally successful; but at last it was resolved to terminate the strife by a treaty of peace, and to endeavour to discover from the Koran which of the two was the rightful calif. By a scandalous trick A. was set aside, but his partisans refused to ratify what they considered an iniquitous decision, and the struggle would doubtless have burst out anew had not A. been assassinated in the mosque at Cufa, 23d January 661, by some fanatical Arabs who wished to recover their old independence, and who had sworn to put Moawiyah and Amru to death also. A. was not only a brilliant warrior, but a man of poetic genius. The best edition of his 'sentences' is that of Fleischer, *Ali's hundert Sprüche Arabisch und Persisch paraphrasirt* (Leipzig, 1837).

Ali, better known as **Ali Pasha**, an Albanian chief, sur-named *Arsian*, 'the Lion,' was born in 1741 at Tepelen. After the death of his father, who had been robbed of the greater portion of his possessions by the neighbouring chiefs, his mother—a woman cruel, vindictive, and unscrupulous—secured the succession for A., then fourteen years of age. In his youth he was subjected to the hardships incident to a life of predatory warfare; but becoming accidentally possessed of wealth, he raised a body of troops, by whose aid he recovered Tepelen. He now commenced to intrigue at the Porte, and was secretly commissioned to kill Selim Pasha of Delvino, receiving in return the lieutenantcy to the Pasha of Derwend. Instead of repressing the *klephtis* (robbers), he shared in their booty; and being deposed by the Porte, he regained its favour by well-timed bribery. In the Turkish war of 1787 against the Austrians and Russians he distinguished himself highly, and was appointed to a pashalic in Thessaly. He cleared the roads of robbers, and usurping the pashalic of Janina, he was confirmed in it by the Porte for the vigour with which he had extinguished anarchy and restored order. He attacked and subdued the Sulhotes, but with circumstances of unspeakable cruelty. He was now made governor of Rumili, where his rule was just, if not beneficent. In 1807 he allied himself with Napoleon, hoping through his influence to obtain Parga, a hope not realised till ten years later, by the favour of England. His power being now securely established, and his dominions largely extended, he caused the commanders of the Greek militia, of whose aid he had hitherto availed himself, to be assassinated. His extortions became intolerable, and the sultan, in 1820, ordered his deposition. Being compelled to abandon Janina, he surrendered on the condition that his life and property should be spared; but he was beheaded, 5th February 1822. He was a man of singular ability, and, though crafty and cruel, tolerant of religious differences. The part he was enabled to play gives us a singularly clear idea of the moral and political condition of the Ottoman empire at the close of the 18th and beginning of the 19th c.

Alia, a town in Sicily, 30 miles S.E. of Palermo. It lies picturesquely on the brow of a hill near the mountain stream Fiume Torto. Pop. 5425.

Aliakoo, an Indian tree, *Menecylon tinctorium*, the leaves of which are used for dyeing yellow.

Alibi, elsewhere. In criminal prosecutions the term is used to denote the defence of the accused when he tries to show that he could not have committed the offence charged against him, because, at the time stated in the indictment, he was not at the alleged place of committal; that is, 'he was elsewhere.' If proved, the defence is in some cases conclusive in favour of the accused; but, as offering much temptation to give false evidence, the plea of A. requires the closest scrutiny from judge and jury. When a witness speaks pointedly as to time, he should be

severely examined as to his reasons for having noted and remembered it so exactly. There are many crimes in which allegation of place of committing is immaterial, such as forgery. In these, proof of A. is of no effect.

Alcan'te, the capital of a maritime province of the same name, Spain, lies in a bay of the Mediterranean, 85 miles S. of Valencia. It is a large seaport with strong fortifications, and is overlooked by a castle 400 feet above the sea. The exports are chiefly cotton and linen fabrics, soda, ropes, corn, oil, silk, and the dark-coloured A. wine (*vino tinto*). The Moors besieged A. in 1331, and the French in 1709. It was bombarded by the Cartagenan insurgents October 1, 1873, but the old citadel and forts were much too strong for the ironclads of the Intransigentes, which retired crippled and exhausted after an action of two days. Pop. (1870) 31,500.

Alica'te, or **Licata**, a seaport on the S. coast of Sicily, 26 miles S.E. of Girgenti, at the mouth of the river Salsa. It is terraced on a hill rising abruptly from the sea, and is overhung by a grand old fortress. It is supposed to occupy the site of the ancient *Phintias* (built 280 B.C.), to which the captive inhabitants of Gela were transferred. Several famous battles of the Carthaginians, Sicilians, and Romans were fought in the town and its vicinity. Large vessels cannot come within a mile of the harbour; but there is considerable trade in fruit, sulphur, soda, and wines. Pop. 14,338.

Alien. The citizen of one state resident in another is an A., unless naturalised. Children of a British subject born out of the British dominions are nevertheless held to be subjects of the British crown, unless the father is under the penalties of high treason or felony; or is in the service of a foreign state at war with Great Britain. It does not affect this privilege that the mother of the child so born is a foreigner; but the child must be from birth legitimate.

The influx of foreigners into England consequent to the French Revolution, led to the passing of several Acts of Parliament, known as the Alien Acts. The object of these was to check and regulate the foreign influx. This is now done under the Peace Alien Act of 1836.

The general rule is that an A., not being an enemy, may, except in the case of British ships, acquire a right to personal property in Great Britain. But in Scotland he cannot acquire or succeed to real property (heritage). These disabilities may be removed by Act of Naturalisation, by Letters of Denisation, or by naturalisation by certificate from a secretary of state. An Act of Naturalisation is an Act of Parliament conferring to considerable extent on the foreigner the privileges of a natural-born subject. The Act cannot be got until the applicant has resided for seven years in Great Britain.

Letters of Denisation are letters-patent issued by the crown, conferring to some extent the privileges of a British subject. Naturalisation by certificate is by Act 7 and 8 Vict. c. 66. It chiefly confers privileges on aliens with regard to succeeding to, devising, or purchasing real or personal estate in Great Britain. An alien is not by any of these forms of naturalisation protected by the British crown against obligations incurred to his native country previous to naturalisation. Thus, a naturalised Frenchman returning to France, and being there held liable to military service, will not be freed from the obligation on the ground of his being a British subject. A British subject resident in a foreign state may, according to our law, divest himself of his nationality, and become a subject of that state. But residence abroad does not of itself cause loss of British nationality.

Align'ment, in military language, means the arrangement of troops 'in line,' or of tents of a camp on a rectilinear plan.

Aliment, or, according to some writers, **Alimony**, is a term of Scotch law, signifying all that is required to maintain life, or its pecuniary equivalent. Those who are unable to support themselves are, in certain circumstances and in respect of certain relationships, entitled judicially to enforce a claim for A. As no superfluity is included, an alimentary allowance is not attachable by arrestment (q. v.)

Aliment'ary Canal is a tube commencing at the mouth and terminating at the anus. Its upper end is in relation to the base of the skull, the succeeding portions traverse the neck, thorax, abdomen, and pelvis, but by far the greater part is contained

within the two latter cavities. The first part consists of the organs of mastication, insalivation, and deglutition, and include the mouth, with its appendages, the teeth and salivary glands, the pharynx, and oesophagus, or gullet. The next portion includes the part more especially connected with digestion, absorption, and defecation, and includes the stomach and intestines, small and great. The digestive tube is lined throughout by mucous membrane, which is supported by layers of fibrous and muscular tissue. The length of the A. C. varies in different animals. It is shorter in carnivorous and omnivorous than in herbivorous animals. A special description of the various parts will be found under the headings Mouth, Pharynx, Oesophagus, Intestine, Small and Large.

Al'imony is, in English law, a term denoting the allowance which may be sued for or given to a married woman on separation from her husband. See ALIMENT.

Aliquot Part is a number which is contained in another number an exact number of times without remainder. Thus, 5, 34, 24, &c., are A. parts of 10, being contained in this last number two, three, and four times respectively.

Alisma'ceæ, a small order of monocotyledonous aquatic plants embracing 5 genera and about 60 species. The water plantain (*Alisma plantago*) is an ornamental plant by the margins of rivers and lakes in Britain. Species of *Alisma* and *Sagittaria* (arrow-head) have a fleshy rhizome which is eatable. Several Brazilian species of *Sagittaria* are very astringent, and their expressed juice has been employed in the preparation of ink.



Alisma plantago.

Al'ison, **Rev. Archibald**, author of the *Essays on Taste*, was born at Edinburgh 13th November 1757, studied at Glasgow and Oxford, and having taken orders, was appointed vicar of Kenley, in Shropshire. Leaving England in 1800, A. accepted the senior charge in an Episcopal chapel in Edinburgh, and died there 17th May 1839. The *Essays on the Nature and Principles of Taste* (1790, 2d. ed. 1811) uphold the 'association' theory of Aesthetics (q. v.), and are elegantly written. It was the appearance of the second edition that called forth Jeffrey's celebrated critique in the *Edinburgh Review*.

Alison, **Sir Archibald**, Bart., historian of modern Europe, was the son of the preceding, and was born at Kenley, Shropshire, in 1792. After studying with distinction at Edinburgh University, he joined the Scotch bar in 1814. In this year, when the allied sovereigns met at Paris, A. visited the French capital, beheld Talma playing 'before a pitiful of kings,' and conceived the great idea of writing an account of the events which led to this brilliant and singular congress of monarchs. In the realisation of this idea, which took the form of *The Modern History of Europe from 1789 to the Restoration of the Bourbons in 1815* (10 vols., 1839-42), and a continuation entitled *The History of Europe from the Fall of Napoleon to the Accession of Louis Napoleon* (9 vols., 1859), the remainder of his life may be said to have been occupied. He qualified himself rigorously for his task, and visited the scenes of the principal battles he describes. His work, which has a world-wide popularity, and has been translated into Arabic and Hindustani, as well as into most of the European languages, is useful, readable, though not vivid, and in the main trustworthy, though often inaccurate in detail. To none of his minor works does any living interest attach itself. A. died May 23, 1867.

Alison, **William Pulteney**, M.D., brother of the historian, born in 1790, studied at the University of Edinburgh, and took his medical degree in 1811. He was the author of several works in sociology and medicine, and was professor of the practice of medicine in Edinburgh University from 1832 to 1855. His principal works are—*Outlines of Physiology and Pathology*

(1833), and *Dissertation on the Reclamation of Waste Land* (1850), in which he advocates the utilisation of the labour of paupers and criminals. A. died September 1859.

Al'wal, a village in the N.W. of India, on the Sutlej, near Ludianah. It was the scene of a brilliant victory of the British, under Sir Harry Smith (28th January 1846), over a Sikh force of superior numbers.

Alk, a gum-resin obtained from *Pistacia Terebinthus*, a tree of Southern Europe, Northern Africa, and Asia.

Alkahest. See ALCHEMY.

Alkalies. Originally the word alkali was used to denote that part of the ashes of plants soluble in water. Later its meaning became greatly extended, all substances which effervesced when treated with an acid being called A. At the present day the name of alkali is restricted to a few substances possessing closely analogous properties. The only important A. are potash, soda, and ammonia, or, as they were previously called, the vegetable, mineral, and volatile alkali. The chief characters of the A. are as follows: They are without exception soluble in water. They neutralise acids, forming salts. The carbonates of the metals which they contain are soluble. They exert a peculiar action on vegetable colouring-matters. Tincture of litmus, which has been reddened by acids, is restored to its original blue colour. Purple cabbage infusion and blue vegetable colours generally are coloured green, and yellow turmeric dark brown. They exert a corrosive action on organised bodies, have a peculiar soapy taste, and precipitate most metals (as hydrates) from solutions of their salts.

With the exception of ammonia, the A. may be regarded as compound of water with the oxide of a metal; Potash, for example, as oxide of the metal potassium and water, K_2O, H_2O ; soda as a compound of oxide of sodium and water, Na_2O, H_2O .

Chemists of the present day, however, take a different view of the constitution of these bodies, regarding them as derived from water by the replacement of an atom of hydrogen by an atom of metal. Thus—

HOH	KOH	$NaOH$
Water.	Potash.	Soda.

With respect to the alkali Ammonia, its solution behaves in some respects like the hydrate of a metal. Nevertheless the hydrate has never been isolated. The A. are used in the arts and in medicine. See POTASH, SODA, and AMMONIA.

Alkalim'etry is the name of the process for determining free alkali in a solution. The process is that of acidimetry reversed. A standard solution of acid is made, and from the quantity of it which is needed to neutralise a measured quantity of the alkaline solution, the quantity of alkali is readily calculated. See ACIDIMETRY.

Alkaloids are a group of organic compounds containing carbon, nitrogen, and hydrogen as invariable constituents, a few only contain, in addition, oxygen and sulphur. Some are prepared artificially, and do not occur in nature; others exist ready formed in the tissues and organs of plants and animals; a few of the latter have also been prepared artificially. Their properties are closely allied to those of the alkalies. They neutralise acids, forming well-marked salts. They often show an alkaline reaction, that is to say, colour turmeric brown, and restore the blue colour to reddened litmus. Many of them are invaluable as medicines, and some are largely employed in the arts as colouring-matters. Subjoined is a list of some of the more important members of this group of bodies. See Watt's *Dictionary of Chemistry*.

Name.	Formula	Source.
Aconitine	$C_{30}H_{47}NO_7$	<i>Aconitum Napellus</i> .
Aniline	C_6H_7N	Benzol.
Atropine	$C_{17}H_{23}NO_3$	<i>Atropa Belladonna</i> .
Brucine	$C_{23}H_{26}N_2O_4$	<i>Strychnos nux vomica</i> , <i>S. ignatii</i> , <i>S. columbrina</i> .
Caffeine or Theine	$C_8H_{10}N_4O_2$	Tea, coffee, &c.
Chinchonine	$C_{20}H_{26}N_2O$	Chinchona bark.
Morphine	$C_{17}H_{19}NO_3$	Opium.
Narcotine	$C_{23}H_{29}NO_7$	
Nicotine	C_5H_7N	Tobacco.
Quinine	$C_{20}H_{24}N_2O_4$	Chinchona bark.
Strychnine	$C_{21}H_{22}N_2O_3$	<i>Strychnos nux vomica</i> , &c.

Alkanet, name given to different species of boraginaceous plants belonging to the genera *Anchusa* and *Alkanna*. *A. tinctoria*, a native of Southern Europe, and cultivated in France and Germany, is the source of A.-root or Alkanna-root, from which is obtained a valuable reddish-brown dye. It is used in giving a crimson colour to perfumery, oils, pomades, salves, soaps, &c. It is also employed in dyeing wood in imitation of rosewood, and for colouring spurious port wine. *Anchusa sempervirens*, Everlasting A., is a naturalised plant in Britain. *A. officinalis*, Common A., has been used as an emollient. Imports of A. to Britain are from 10 to 12 tons annually.

Alkan'na (see ALKANET), also applied to a colouring-matter called Henna (q. v.), prepared from *Lawsonia alba*, a dwarf Indian shrub.

Alkmaar, a town of N. Holland, stands on the Helder Canal, 25 miles N.N.W. of Amsterdam by railway. It has a fine Gothic town-house. In 1799 the Duke of Voik surrendered his army at A. after being twice defeated by the French. It exports 9,000,000 lbs. of cheese annually—probably more than any other town in the world. There are considerable manufactures of sail-cloth and parchment. Henry of A., a famous Dutch poet of the 15th c., was born here. Pop. (1870) 11,427.

Alla Breve, a musical term, having its origin in the fact that the *breve*, the longest note in old music, was twice as long as the longest note at present used, and signifying that each note is to be played or sung as if it were only half its written length.

Allah (Ar. *al* and *ilah*, the worthy of adoration), the Arabic name of God, now in use in all countries to which the religion of Mohammed has spread. The Prophet's conceptions of the character of A. are essentially Judaic, and rise high above the prevailing grossness of Oriental fancy, but they also express his antagonism to the Christian mystery of the Trinity, and are, so to speak, a dogmatic declaration of monotheism: 'There is no God, but the God (Allah). This only true, great, and highest God has existence of himself is eternal, *not begotten and begets not*, is sufficient of himself, fills the universe with his infinity, is the centre in which all things unite, visible and invisible lord of the material and spiritual worlds, creator and ruler, almighty, all-wise, all-good, merciful, and whose decrees are irrevocable.'

Allahabad ('city of God'), an ancient and renowned city in British India, N.W. Province, chief city of the district of A., at the confluence of the Ganges and Jumna, about 500 miles W.N.W. of Calcutta, and 75 W. of Benares. It is regarded, from its situation, with pious veneration by the Hindus, who annually visit it in great numbers for the purpose of ablution in the sacred streams on which it stands. The native part of the city is generally mean and unattractive, though there are some ancient monuments of great beauty. The European quarter is greatly superior. A. possesses barracks for the European, and cantonments for the native, troops, in connection with which are numerous fine villas and bungalows. The chief buildings are the fort, built by the Sultan Akbar in 1583, at the junction of the rivers, the Great Mosque, and the Sultan Khosru's Caravanserai. The situation of A. makes it of great commercial importance, and it is the seat of an extensive trade in cotton. It is a station on the Grand Trunk Road and East Indian Railway. Pop. (1871) 105,926. By treaty in A. in 1765, Bengal, &c., was ceded to the English. It became memorable during the mutiny of 1857 as the scene of a massacre of English officers by native troops. The insurrection was promptly suppressed by Colonel Neil, who marched from Benares.

The division of A., in the N.W. Province of British India, is bounded N. by Oude and Agra, E. by Behar, S. by Gundwana, W. by Malwa, is about 270 miles in length and 120 in breadth, and has an area of 13,421 sq. miles. Pop. (1871) 5,468,955. It is watered by the Ganges, Jumna, and Gomtee, and is one of the most productive and populous districts in India. Among its products are cotton, indigo, sugar, opium, coffee, grain, and fruits.

Allaman'da, a genus of handsome climbing shrubs, natives of S. America, and belonging to the natural order *Apocynaceæ*. They are prized in gardens for their gorgeous profusion of rich golden flowers. The best known species are *A. Aubletii*, *A.*

Schottii, and *A. nerifolia*. An infusion of the leaves of *A. cathartica* is used as a remedy for colic.

Allan, Bridge of, a picturesque village in Perthshire, on the F. H. N. 3 miles N.W. of Stirling. Its sheltered position and mineral (saline) wells have made it a great resort of invalids, for whose accommodation there are good lodgings and capital hotels. Pop. (1871) 3055.

Allan, David, sometimes styled the Scottish Hogarth, was born at Alloa, February 13, 1744. In 1755 he was sent to the academy of the Foulises at Glasgow to learn to be a painter, and in 1764 he went to Rome. Here in 1773 he gained the gold medal of the Academy of St Luke for an historical composition, the 'Origin of Painting,' which was engraved by Cuneo, and is A.'s best picture. In 1777 he visited London as a portrait-painter, and in 1786 was made master of the Art Academy at Edinburgh, where he died, August 6, 1796. His most popular designs are his illustrations of Ramsay's *Gentle Shepherd*.

Allan, Sir William, historical painter, born at Edinburgh in 1782, entered the School of Design, where Wilkie was his fellow-student, and afterwards studied at the Royal Academy. Dissatisfied with his success in London, he went to St Petersburg, and remained there nearly ten years, making occasional journeys to the Crimea, &c., where he gathered materials for after use. Returning to Edinburgh in 1814, he exhibited his 'Circassian Captives,' which fixed his reputation as an artist, though his works did not at first command a ready sale. A disease of the eyes compelled him to desist from painting for a time, during which he visited the S. of Europe and Asia Minor, and on his return he painted his 'Slave-market at Constantinople.' In 1826 he was elected A.R.A., and became R.A. in 1835. In 1838 he was chosen president of the Scottish Academy, and succeeded Wilkie as her Majesty's Limner for Scotland in 1841, when he was knighted. He died 22d February 1850. The fidelity, skilful composition, and vigour of his works merit the highest praise. His illustrations of Scottish history are well known through engravings.

Allantois is a bag or sac found in the embryo. It arises from the termination of the alimentary canal, which, at this early period of development, is shut, and it subsequently becomes differentiated into the bladder, the urachus (a tube passing from the bladder to the umbilicus), and into a bag situated outside the abdomen. In batrachians, such as frog and toad, the A. never extends beyond the abdominal cavity; in scaly reptiles, and in certain mammals, it surrounds the body of the foetus, lining the outer covering of the ovum called the chorion; in most mammalia the extra-abdominal portion is small, and uniting with a portion of the chorion, forms the organ known as the placenta, by which the foetus is connected with the mother. The function of the extra-abdominal portion of the A. is to nourish the early foetus, and also to act as a respiratory membrane.

Allegha'nies. See APPALACHIANS.

Allegha'ny, a river of N. America, rises in Pennsylvania, about 5 miles from Lake Erie, with which it is connected by a canal. It joins the Monongahela at Pittsburg, and forms the Ohio, next to the Missouri, the largest affluent of the Mississippi. The A. is navigable for 200 miles above Pittsburg, and is part of perhaps the longest steamboat channel in the world, stretching from Lake Erie to the Gulf of Mexico, a distance of about 2400 miles.

Allegheny, a flourishing city of Pennsylvania, U.S., on the river Alleghany, opposite Pittsburg, and 350 miles S.W. by W. of New York by railway. It communicates with Pittsburg by five fine bridges, and has forty-five churches, of which fifteen are Presbyterian, nine Methodist, and ten Roman Catholic. There are three theological seminaries, various benevolent institutions, the Western Penitentiary, a fine public park, a soldiers' monument (costing 40,000 dollars), a public library, tramways, and extensive waterworks. The manufactures are cottons, woollens, iron, steel, locomotives, machinery, leather, salt, white-lead, &c. The city is rapidly increasing. Pop. (1870) 53,180.

All'giance is the fidelity due by every natural-born and naturalised subject to the crown. Temporary A. is also due to the crown by foreigners resident in the kingdom. 'True A. to the sovereign' is sworn by all who take the Oath of Abjuration (q. v.).

Allegory, a figure of speech which represents trains of thought by visible images, and which may be described as a continued metaphor. It was popular, especially in the East, from an early period, and the 80th Psalm, containing the comparison of Israel to a vine, is a famous and well-sustained example. Spenser's *Fairy Queen*, Thomson's *Castle of Indolence*, Swift's *Tale of a Tub*, Addison's *Vision of Mirza*, and particularly Bunyan's *Pilgrim's Progress*, are well-known allegories. A. may be exhibited in the fine arts, or on the stage, with as much effect as in language. In religious literature, *Allegorical Interpretation*, which gives a higher and more spiritual significance than appears in the letter, was once popular. Its use was of great antiquity, though generally associated with the Alexandrian and Jewish schools. Philo-Judæus among the Jews, and Origen among Christian writers, were much addicted to A., Origen asserting that to those who understood them literally the Scriptures were of little use.

Alle'gro (Ital. *lively*), a musical term indicating that the piece of music so marked is to be played in somewhat quick time, and in a spirited and lively manner. In a composition of several movements each is commonly distinguished by the time which is marked upon it; in this way A. is often used as a substantive, as the A. of a symphony, &c.

Allen, Bog of, a morass of vast extent in the centre of Ireland, covering part of King's County and Kildare. It is bounded by the Shannon on the W., and comes within 17 miles of Dublin on the E., having an area of about 240,000 English acres. All attempts to reclaim the bog have failed, the depth of peat found in it being 25 feet. The rivers Barrow and Boyne rise in this swamp, which is also traversed by the Royal and Grand Canals.

Allentown, a town of Pennsylvania, U. S., on the W. bank of the Lehigh river, 50 miles N. of Philadelphia, is the centre of a district rich in iron ore and anthracite. It has numerous iron-works, and is connected with the capital by a canal and railway. Pop. (1870) 13,884, chiefly Germans.

Alleyn, Edward, actor, was born 1566, and died 1626. He is noted as the friend of Shakespeare, but still more as the generous founder of Dulwich College (q. v.), the building of which was commenced in 1613, and its charter granted in 1619. His wife and he lived there on his own foundation. By his will he endowed twenty almshouses in London. See Payne Collier's *Memoirs of Edward Alleyn* (Lond. 1841), also the *Alleyn Papers* (1843).

Allia, a rivulet falling into the Tiber, 11 miles N. of Rome, supposed to be identical with what is now known as the *Scolo del Casale*.

Alliaceus Plants, those having the smell of garlic, such as species of *Allium* (q. v.), and plants allied to them.

Allia'ria, a genus of Cruciferous plants having a garlic odour. *A. officinalis*, called garlic-mustard, sauce-alone, and Jack-by-the-hedge, is a common biennial hedge-bank plant in many parts of Britain. Some authors have placed it in the genus *Erysimum*, and others in *Sisymbrium*. It is occasionally used as a pot-herb, and seems worthy of cultivation for its nutritious qualities. Its powdered seeds have been employed to provoke sneezing.

Alice, or Common Shad, a species of shad—the common shad (*Clupea alosa*)—which fish is included in the *Clupeidae* or Herring family. See SHAD.

Allier, a department in the heart of France, sloping from the highland region of Auvergne N. to the Loire. Area, 2830 sq. miles; pop. (1872) 390,812. It formed part of the old province of Bourbonnais. The soil varies in quality, but is generally fertile, and though agriculture is not scientific, the cereal produce is considerable. Cattle-breeding is an important industry, and both red and white wines are grown. The numerous streams, all of which flow into the Loire, are stocked with fish. The mineral wealth of A. is great, especially in iron, coal, marble, granite, and chalk, and there is also some manufacturing activity. The mineral springs of Vichy are celebrated. Capital, Moulins.

Allier, a river of France, from which the department takes its name, rises at an elevation of 4380 feet in the mountains of Lozère, a western spur of the Cevennes, flows in a northerly direction through Haute-Loire, Puy-de-Dôme, and Allier, pass-

ing the towns of Brionde, Issoire, and Moulins, and falls into the Loire a little below Nevers after a course of more than 200 miles, for nearly two-thirds of which it is navigable.

Alligation is a rule in arithmetic which treats of the solution of questions, such as these: Given the prices per pound and the quantities of the ingredients of any mixture, what is the price per pound of that mixture? In what proportion must the ingredients (the prices of which are known) be mixed in order to produce a known mixture? Any good treatise on arithmetic or algebra will give the methods for the solution of such.

Alligator, or Caiman. This reptile forms a genus of the order *Crocodylia*, and presents differences both in structure and distribution from the more familiar crocodiles. The head is short and flattened, the teeth number from thirty-six to forty-four in each jaw, and the fourth (or canine) tooth of the lower jaw is received into a distinct pit or cavity in the palatal surface of the upper jaw, and is therein concealed when the mouth is closed. The upper jaw, in old specimens, may be quite perforated by these lower teeth. The hind limbs are not fringed as in the crocodiles, and the feet are only imperfectly webbed. The alligators are more terrestrial in habits than the crocodiles. They are chiefly nocturnal animals, inhabiting muddy swamps, and lying concealed during the day. The food consists mainly of fishes, but also includes higher animal fare. The eggs are



Alligator, or Caiman.

deposited in the mud or sand, and are hatched by the sun's heat, although the females are said to hover about the spot and to jealously guard the welfare of their progeny. In length, alligators vary from 3 to nearly 20 feet, and several distinct species are known. They chiefly inhabit the tropical regions of America, but occur in both divisions of that continent. The *A. Mississippiensis* is the most familiar form, this species inhabiting the Southern States of the Union. The Caiman found in Guiana (*A. palpebrosus*), and the Spectacled *A. (A. sclerops)*, so named from the osseous rings surrounding the eyes, are also familiar to naturalists. These animals take the place in America of the crocodiles of the Old World; although species of crocodiles also occur in the New World. The flesh is eaten by the Indians and negroes, and an oil is extracted from the fat of some species. In the Eocene deposits of England *A.* fossil remains occur.

Alligator Apple, a W. Indian fruit, the produce of *Anona palustris*. It has narcotic principles, and is not eaten. See CUSTARD APPLE.

Alligator Pear, a highly-esteemed W. Indian fruit. See AVOCADO PEAR.

Alligator Wood, a timber imported from Cuba, obtained from a species of *Guarea*.

Alliteration, in composition, is the recurrence of the same letter at the beginning of successive words. Its nature and function are accurately described in a familiar verse of Pope's, which is also a felicitous illustration of the thing—

'Apt alliteration's artful aid.'

Among the Teutonic nations *A.*, and not rhyme, was the distinctive feature of verse. English verse down to the Norman Conquest was exclusively alliterative, and even after English had assumed a somewhat modern form *A.* still maintained its place. The author of *Piers Plowman*, who was a contemporary of Chaucer, uses it. So long as it was the characteristic mode of English versification the rule was that two words of the first hemistich of a verse should begin with the same letter, and one of the second, and that these words should be emphatic. After the triumph of rhyme *A.* became a mere adornment, and was used capriciously, according to the taste or want of taste of the writer. In Spenser's *Fairy Queen* it is superabundant, and in some of the prose writers of the same century it is employed with ludicrous elaboration; e.g., 'The chickens of the church,

the sparrows of the spirit, and the sweet swallows of salvation.' When Alexander Scott addresses Queen Mary of Scotland thus:—

'Fresh, fulgent, flourist, fragrant flower formose,' &c.,

A. degenerates into a painful blemish, but when used with skill and an ear for melody it has an exquisite effect. Coleridge furnishes a faultless specimen—

'The fair breeze blew, the white foam flew,
The furrow followed free.'

So naturally do men employ *A.*, that it has affected many colloquialisms in all languages, e.g., through thick and thin, house and home, house and hall, &c., and it often gives the chief point to witty and satiric writings—as when it was said of Cardinal Wolsey—

'Begot by butchers, but by bishops bred,
How high his haughty honour holds his head.'

Allium, a genus of bulbous plants belonging to the natural order *Liliaceæ*, and remarkable for their pungent odour. The species are

numerous, very few of them ornamental, but several are cultivated as esculents, such as the Chive (*A. Schoenoprasum*), the Garlic (*A. Sativum*), the Leek (*A. Porrum*), the Onion (*A. Cepa*), the Kocambole (*A. Scorodoprasum*), and the Shallot (*A. ascalonicum*). There are nine species indigenous to Britain. *A. ursinum*, Ramsons, or broad-leaved Garlic, is common in most woods, and occasionally in damp pastures. When eaten by cows, it gives a strong garlic odour and taste to their milk. *A. vineale*, Crow-garlic, also a common British species, acts in the same way.



Allium ursinum.

Alloa, a seaport, Clackmannanshire, Scotland, on the N. bank of the Forth, 7 miles below Stirling. It is an old town, but of late years has been greatly improved. It is a station on a branch of the Stirling and Dunfermline Railway, and is connected with the Scottish Central by a steamboat ferry across the Forth. *A.* has a good harbour, a dry and wet dock, and the total shipping registered at the port in 1874 amounted to 5527 tons. There are extensive manufactures of whisky, ale, glass, woollens, pottery, and machinery, and near it large coal-pits. The chief exports are coal, ale, and glass; imports, fax, linseed, wool, and iron. *A.* House, the ancient seat of the Earls of Mar, in the vicinity of *A.*, was burned in 1730; the tower, 89 feet high, built in the 13th c., is still standing. Pop. (1871) 9362.

Allocution, properly any formal address, but originally applied to the address of a general to his troops. It is now generally restricted to the addresses made by the Pope to the College of Cardinals on matters of ecclesiastical or political importance. These are in reality official utterances.

Allodium, or **Allodial Tenure**, is a term used in contradistinction to *feudal*, or *feudal tenure*. The right to all personal property is allodial. In England, with regard to real property, the fundamental legal maxim is, according to Blackstone, that 'the king is the universal lord and original proprietor of all the lands in his kingdom; and that no man doth, or can, possess any part of it but what has, mediately or immediately, been derived as a gift from him, to be held upon feudal services.' In England, therefore, allodial tenure does not exist. This universality of feudal tenure was recognised in England shortly after the Norman Conquest, when all the principal landholders submitted to the yoke of military tenure. The military services to be rendered by the proprietors have long ago fallen into desuetude, and the legal tenure has become a fiction; yet a chain of titles, if complete, is always found to have its last link in the paramount superiority of the crown. See FEUDALISM. The only allodial tenures of real property in Great Britain are the Udal rights in Orkney and Shetland, which formerly belonged to Denmark, in which country, though feudality is the general rule of tenure, it is not universal.

Allopathy. See HOMŒOPATHY.

Allot'ment of Land. This is an English law expression. It signifies a grant of a portion of land too small to be worth a formal conveyance. Under the General Enclosure Act, it is allowed to be made to any one in actual possession; but the grant does not injure a title previously existing. Commissioners are appointed to make these allotments. The system was not much used till the year 1830, when a great deal of agricultural distress prevailed in England. It is said to have acted beneficially; to have diminished crime in agricultural districts, and to have improved the character of the peasantry.

Allotropy is a term used in chemistry to designate the property possessed by certain substances of existing in two or more distinct states, the chemical and physical properties of the same substance differing in each of the states in which it exists. Phosphorus is an excellent example of an allotropic element. Common phosphorus is a colourless or slightly yellow, semi-transparent solid, at ordinary temperatures, much resembling wax in consistence and appearance. Its specific gravity is 1.826. It fuses at 44° C., and boils at 290° C. It has a powerful affinity for oxygen; so great, indeed, that in warm weather phosphorus often ignites if exposed to the air, from the heat developed by its rapid oxidation. It is luminous in the dark, perhaps from the same cause. It is very readily inflammable, igniting at a temperature of 60° C. It is soluble to a considerable extent in bisulphide of carbon, and also in many oils, resins, and essences. It is one of the most active irritant poisons known. If this variety of phosphorus be heated in an inactive atmosphere, such as nitrogen or carbonic acid, to a temperature of 250° C., every one of its properties become modified or altered. It now presents the appearance of a dark red or chocolate coloured, perfectly opaque, odourless mass. Its specific gravity has increased to 2.1. It ceases to emit light in a dark room, does not ignite by friction, nor till heated to a temperature above 270° C. It has lost its power of dissolving in those substances which dissolve ordinary phosphorus, and fuses first at a temperature of 250-270° C. Being insoluble, it does not act as a poison. The causes of A. are not understood.

Alloway Kirk, a small ecclesiastical ruin on the Doon, near Ayr, the scene of the *diablerie* described so inimitably in Burns's *Tam o' Shanter*. The cottage where Burns was born is in the vicinity of A. K.

Alloy, or Alloy, in law, denotes the inferior metals mixed in the gold and silver of our coinage. It is used to pay the expense of coinage, and to make the gold or silver more fusible. The A. in gold coin is silver and copper; in silver coin it is copper alone. The standard of gold is 22 carats pure, and 2 of A. in the pound troy. The standard for silver is 11 oz. 2 dwt. pure, to 18 dwt. of copper A. The pound of standard gold is coined into the value of 44½ guineas. A poundweight of standard silver is coined into 62 shillings.

Alloys are made by fusing together different metals in various proportions. The physical properties of an alloy differ as a rule very considerably from those of the metals of which it is composed, and it is owing to this fact that A. are of so much importance in the arts and manufactures, for comparatively few metals possess properties which fit them for use in the pure state. Gold and silver, for instance, are not sufficiently hard to be used for coins; if employed for this purpose in the pure state, they would rapidly wear away from the constant attrition to which they are subjected. They are therefore alloyed with a small quantity of copper, which has the effect of producing comparatively hard and resisting metals well suited for purposes of currency. Although the properties of individual metals may be well known, it is not possible to foresee the properties of the A. which may be formed by fusing them together. It is known, however, that brittle metals form brittle A., and that the alloy of a brittle with a malleable metal is also brittle; further, that the fusing-point of an alloy is always below the mean of its ingredients; *fusible metal* is a familiar and striking example of this.

The properties of an alloy depend not alone on the metals of which it is composed, but also on the proportions in which these are present; thus, tin forms A. with copper, which, as they increase in percentage of the former metal, are known respectively as bronze, gun-metal, bell-metal, and speculum-metal.

With regard to the chemical nature of A., it becomes a question whether they should be classed amongst the mixtures or compounds, for they partake of the properties of both. It seems probable that some A. are really chemical compounds, whilst others are merely *solutions* of metals in these. Subjoined is a list of the more important A., with their percentage composition:—

Bronze	Copper 95	Tin 5
Gun-metal	Copper 90	Tin 10
Bell-metal	Copper 78	Tin 22
Speculum-metal	Copper 66	Tin 34
Brass	Copper 64	Zinc 36
Aluminum bronze	Copper 90	Aluminum 10
Hard solder	Brass 66	Zinc 34
German silver	Copper 51	Zinc 30.6, Nickel 18.4
Britannia metal	Brass 25	Tin 25, Antimony 25, Bismuth 25
Pewter	Tin 80	Lead 20
Plumber's solder	Tin 66	Lead 44
or	Tin 50	Lead 50
Type-metal	Tin 25	Lead 50, Antimony 25
Fusible-metal	Tin 25	Lead 25, Bismuth 50

All-Saints' Bay, a magnificent natural harbour in the province of Bahia, Brazil. It is 37 miles long, 27 broad, and contains several islands. The town of Bahia (q. v.) lies just within the entrance.

All-Saints' Day, or Hallowmas, a festival of the Church of Rome in honour of *all saints* who have not a separate day assigned them in the calendar. It was instituted in 835 by Gregory IV., and fixed to be held on November 1st, probably because that was the date of the celebration of one of the four great festivals of the northern pagans. The preceding night, called the Eve or Vigil of A., was even more than the day itself distinguished by popular usages, such as the kindling of bonfires, bell-rings, &c.

All-Souls' College, Oxford, founded in 1437 by Henry Chichele, Archbishop of Canterbury, for a warden, forty fellows, two chaplains, and clerks. A professorship of 'International Law and Diplomacy,' and another of 'Modern History,' have been endowed with the revenues of ten suppressed fellowships. The remaining thirty are open. The college holds the patronage of nineteen benefices of the yearly value of £7925. In 1875 it had 115 on its books.

All-Souls' Day, a festival of the Church of Rome, instituted in 993, or 998, by Odilo, Abbot of Clugny, and celebrated on the 2d of November. Its object is, by supplication and almsgiving, to relieve souls in purgatory; and the occasion of its institution is said to have been the report to Odilo that a hermit in Sicily had often heard the devils complaining of the number of souls released from suffering by the prayers and almsdeeds of the pious. In the W. of England it was customary to bake a soul-cake on All-Souls'-Day, and for neighbours to share it with one another. There children still go *souling*, which consists in singing certain verses, and importuning for small gifts.

Allspice, the name given to the dried berries of *Eugenia pimenta* and *E. acris* of the W. Indies, from their having the combined flavour of cinnamon, nutmeg, and cloves. Called also Jamaica Pepper and Pimento (q. v.) Carolina A. is the bark of *Calycanthus floridus*, which is used as cinnamon.

Allston, Washington, painter and poet, was born 5th November 1779, at Waccamau, S. Carolina. On graduating from Harvard (1800) he devoted himself to art, studying first at Charleston, then in the Royal Academy, London, and finally at Rome, where he was intimate with Thorwaldsen. In 1811 he again visited England, and carried off the 200-guinea prize of the British Institution for his *Dead Man raised*



Allspice.

by *Elisha's Bones*. He was elected an A.R.A. in 1819. He excelled as a colourist, being in this respect a successful imitator of Rembrandt. His poem, *Syllaps of the Season* (Lond. 1813), was much admired. A. died 8th July 1843, at Cambridge Port, Mass.

Alluvion. This is a legal term signifying the land gained from the sea. By English law this belongs to the owner of the soil on which the A. takes place, provided it does so gradually, as it commonly does, by the slow accumulation of sand and earth drifted ashore by the waves. A sudden and considerable gain, however, to the shore from the sea is held to belong to the crown, unless it has given a charter to a subject *cum littore maris*, in which case the A. belongs to the grantee. In Scotch law the A. in both events belongs to the owner of the adjacent shore. Where a river in Scotland dividing two properties insensibly changes its course, it is still held to be the boundary; but if the change be sudden and material, it will no longer be held to be so, the law allowing equitable alteration. *Alluvio* is the Scotch law-term for the gradual change, *Avulsio* for the sudden.

Alluvium (Lat. *ad*, to, and *luere*, to wash), a term originally applied to ante-Deluge deposits, but now given to deposits of sand, mud, gravel, &c., which are washed down by a stream, and which form the banks and lowlands about its mouth.

Allygurrh, an important fort, the military headquarters of a district of the same name in India, situated about midway between Agra and Delhi, being 74 miles S. of the latter by rail. It occupies a strong position in the midst of a morass, and commands the road from Agra to Meerut. It was taken by the British in 1803. During the mutiny (1857) it was held by the insurgents for a considerable time, almost severing the communication between the S.E. and N.W. A. lies a little N. of the town of Coel (q. v.)

Al'ma, a small river in the Crimea, rises near the Tchadir Dagh, flows westward, and enters the Black Sea midway between Sebastopol and Eupatoria. It is celebrated in connection with the battle in which the Russian forces, under Prince Menschikoff, were driven from a strong position, and totally routed by the allied armies of England and France, commanded by Lord Raglan and Marshal St Arnaud, 20th September 1854.

Almack's, a suite of assembly-rooms in King Street, St James's, London, built in 1765 by one M'Call, and much patronised by ladies of rank. They are now known as Willis's Rooms. The name A. is said to be an inversion of M'Call.

Alma'da, a town in the province of Estremadura, Portugal, 2 miles S. of Lisbon, near the mouth of the Tagus. It is noted for its figs, and near it is the Adissa gold mine. Pop. 5500.

Almaden del Azoque (Arab. 'the mine of quicksilver'), a town in La Mancha, Spain, situated in a glen of the Sierra Morena, on the railway between Ciudad Real and Badajoz. It is the *Cisapona Celcorix* of the Romans, and possesses the richest quicksilver mines in the world. Managed by the firm of Rothschild, these mines yield 2,000,000 lbs. of metal annually. Pop. 7400.

Almagest, the Arabic name of the great work of Ptolemy the astronomer (q. v.)

Almagro, a town in New Castile, Spain, 13 miles E.S.E. of Ciudad Real. It possesses a beautiful church of the 16th c., and is an important agricultural town, with considerable manufactures, chiefly in lace, soap, pottery, and brandy. Pop. 8600.

Almagro, Diego d', a Spanish adventurer, who took part with Pizarro (q. v.) in the conquest of Peru, was born (according to Herrera) in 1475, at Alden del Rey. At an early age he emigrated to the New World to push his fortunes, and by one means or another had acquired, in the course of years, considerable wealth. In 1525, at the age of fifty, he joined Pizarro in his famous expedition from Panama, which resulted in the conquest and subjugation of the vast empire of the Incas by a handful of daring and unscrupulous cavaliers. The story of the perils and hardships they endured while feeling their way S. along unknown shores, and among hostile savages, invests with a halo of romance careers that otherwise display mere criminal ambition

and sordid greed. The first three years (1525-28) had been spent in the discovery of the way to Peru, after which they returned to Panama, and Pizarro proceeded to Europe to obtain from Charles V. the necessary authority for what remained to be done. In 1531 the adventurers, empowered by royal sanction for the work of rapine, set sail from Panama a second time, Pizarro first, and A. soon after. The latter only arrived when the capture of Atahualpa (q. v.) had been achieved, but he is partly responsible for the unjust sentence which condemned the Inca to death. By the letters-patent of Charles V., dated Toledo, 26th July 1528, A. was made governor of all the land S. of Peru. This meant that he must undertake the conquest of Chili, which he did with less than 600 men, and would probably have carried out his enterprise successfully had he not, after two months' stay in the new region, been summoned back to Peru by the startling news of an Indian revolt, the massacre of many Spaniards, and the beleaguering of the brothers of Pizarro in the city of Cuzco. A. defeated the Peruvians with great slaughter, and compelled them to raise the siege; but when the brothers of Pizarro, between whom and himself enmity existed, refused him admission into the city, he forced an entrance by night, captured his adversaries, and proclaimed himself master of Cuzco. A force sent against him by Pizarro was completely routed, but in a second engagement in the plain of Cuzco, 26th April 1538, the troops of A. were almost annihilated, and A. himself was made prisoner, and shortly after strangled. His son, also called Diego d'A., a youth of great bodily vigour, prowess, and military skill, formed a party to revenge his father's death, and on the 26th June 1541 succeeded in assassinating Pizarro. He caused himself immediately to be proclaimed Governor of Peru, and obtained a partial recognition; but on the 16th September 1542 his partisans were utterly crushed by the royal army in the plain of Chupas, and A., captured on the field, was immediately beheaded. See Herrera's *Historia general de los Hechos de los Castellanos en las Islas y Terra firme del mar Oceano* (Madr. 1601-12), Zarate's *Historia del Descubrimiento y Conquista del Peru* (Antw. 1555), and Prescott's *Conquest of Peru* (1847).

Almalik, or **Elmaley**, a prosperous town in the vilayet of Konia, Asiatic Turkey, on the Myra, 25 miles from its mouth, and 40 S.W. of Adalia, surrounded by the lofty Massanghis Mountains. It contains a large bazaar, and a market much visited by European merchants. The thrifty and industrious inhabitants are chiefly employed in the factories, mills, dye-works, and tanneries of the town. Pop. 11,000.

Al'ma Ma'ter (Lat. 'nourishing mother'), a university, in relation to its students. *Alma* was applied by the Latin poets to such goddesses and natural objects as were *beneficent* to men.

Almanac, derived from the Arabic article *al*, and *manah*, to count, is, in the modern acceptance of the term, an annual publication containing important and interesting information on a great variety of topics, political, religious, commercial, agricultural, astronomical, social, &c. The origin of almanacs goes back to the times of the Alexandrian Greeks, but there is no record of the date of their introduction into Europe. Probably they were in use from an early age in connection with astrology; but the earliest mention of them belongs to the 12th c., when we meet with the name of Solomon Jarchus, who published one in 1150. Purbach published one from 1450-61, and his pupil Regiomontanus brought out the first printed A. in 1475; but by far the most wonderful A.-maker of the middle ages was Nostradamus (q. v.)

In the 16th c. Henry III. of France prohibited the printing of *almanacs* containing political predictions, prophecies being, at that time, their great feature, Nostradamus particularly shining in the prophetic department. The *Almanach Ligeois*, first published in 1636, and still flourishing, is perhaps the most lively and ingenious of these venerable quackeries. In England, until the present century, all almanacs were full of this prognosticating stuff. They were almost all published by the Stationers' Company, which, though deprived in 1775 of the monopoly for the publication of such periodicals, which had been granted it by James I., managed to buy up most of the other similar publications. The first A. bereft wholly of astrological rubbish was the *British A.*, published in 1828 by the Society for the Diffusion of Useful Knowledge; and so marked

was its success, that the Stationers' Company brought out a rival and similar periodical, viz., the *Englishman's A*. The heavy stamp-duty of 15d. the copy imposed upon almanacs in Britain was abolished in 1834.

Oliver and Boyd's New Edinburgh A., which now consists of 800 pages, was originally called the *Edinburgh A.*, and was first published in 1683 as a rival to the *Prognostications* published at Aberdeen in the beginning of the 17th c. Similar in nature, but even more extensive than *Oliver and Boyd's*, is *Thom's Irish A.*

Among other important national almanacs, we may mention the French *Almanach Impérial*, the Belgian *Royal A.*, the Prussian *Royal A.*, and the American *A.* The *Almanach de Gotha* has more of a cosmopolitan character, containing some information about almost every country.

The *Nautical A.*, first projected by Maskelyne, the astronomer-royal, and published by the government in 1767, is the most important and useful astronomical publication in Britain, and is now published three or four years in advance. Similar, and equally excellent, are the French *Connaissance des Temps*, and the Berlin *Ephemeris*.

The name *A.* is also applied to antiquated carved calendars, used by the Scandinavian nations, in which certain days, such as feast-days and saints' days, were represented by symbols.

Alman'sa, a town of Murcia, Spain, lies 43 miles E. of Albacete, on the Madrid and Alicante Railway. Pop. 7300. It is gradually improving, and has manufactures of brandy, leather, soap, linen, hempen, and cotton fabrics. The battle of A. (April 25, 1707), in which the English and Spanish allied troops were defeated by a superior force of the French, was one of the most important of the succession wars of Spain.

Alman'sûr (Abu-Jafar-Abdallah-ben-Mohammed, surnamed *al-Mansûr*, i.e., 'whom God helps'), born about 712, was the second calif of the house of the Abbasides (q. v.), and reigned from 754, when he succeeded his brother, till his death, October 18, 775, during a pilgrimage to Mecca. He rid himself of his rivals to the throne by the most cruel and treacherous means. His energies were severely taxed to crush successive revolts in various provinces of his empire; but his main efforts were directed against the Mussulman sectaries, whom he hoped to crush by imprisoning their leaders. Popular odium was excited against him, and he found himself besieged in his own palace. When relieved, he withdrew to the banks of the Tigris, where, in 762, on the site of the ancient Seleucia and Ctesiphon, he founded Bagdad. Two rival califs proclaimed themselves, the one at Medina and the other at Bassora, but they were crushed by Isben-Mousa, the general and cousin of A. The leading features of A.'s character were ingratitude, intolerance, and avarice. The latter characteristic, however, enabled him to leave in the treasury at his death a sum equivalent to £28,000,000 sterling. But he was a friend to letters, and had translations made of the Greek and Latin authors into Arabic, or some other of the languages spoken in his dominions. Plato, Herodotus, Homer, and Xenophon were translated into Syriac; medical and botanical works into Persian; Euclid from the Syriac, and the fables of Bidpai from the Persian, into Arabic. The translator of the latter work was, for a departure from orthodoxy, ordered by A. to be burnt alive.

Alm'sa, the name of a number of towns in Hungary, the chief of which is in Zombor, Woiwodina, 16 miles W. of Maria Theresienstadt. It has a population of 7938, nearly all Roman Catholics.

Almazo'ra, a town in Valencia, Spain, 4 miles S. of Castellon de la Plana. It lies in a fertile plain, 3 miles from the mouth of the Mijares, and manufactures paper and linen and woollen fabrics. Pop. 5150.

Almei'da, a strong fortress in the province of Beira, Portugal, near the Spanish frontier. It was taken by Spain in 1762, but subsequently surrendered. The French, under Marshal Massena, captured it (1810) from the British; but it was recovered in the following year by Wellington, and restored to Portugal. Pop. 4500.

Almeida, Don Francisco d', Portuguese Viceroy of the Indies in the beginning of the 16th c., was the seventh son of

the Count of Abrantes, and first won reputation as a soldier, fighting for Ferdinand and Isabella of Spain against the Moors. Appointed Viceroy of the Indies by Emmanuel I. of Portugal in 1505, he sailed for Asia, deposing by the way the King of Quiloa, on the Mozambique coast, and installing another in his place. Along the W. coast of India he effectively asserted the Portuguese supremacy, and, carrying out the aim of his expedition—to extinguish the commerce of Egypt and Venice in the East—he destroyed the Egyptian fleet near Diu, in Cambay. During his administration the Portuguese discovered the Maldives, Ceylon, and Madagascar. After violent altercation with Albuquerque (q. v.), who was sent out to supersede him, and whose authority he at first refused to recognise, A. resigned the viceroyalty, and set out on his return to Europe, November 1508, but was killed by an arrow-wound in a miserable encounter with natives in the Bay of Saldanha, March 1, 1510. A. was brave and disinterested. The court of Spain went into public mourning when the news of his death reached Europe.

Almeria (Arab. 'the conspicuous'), a seaport and capital of a province of the same name in Andalusia, Spain, on the Bay of Almeria. It is the ancient Murgis, or 'great port,' of Eastern traffic, and in the time of the Moors was the most flourishing city in the kingdom, next to Granada. It is now, however, a place of little importance, but it still retains part of its once prosperous trade in wine, cochineal, lead, red silk, and grapes. In the vicinity are numerous hot springs and extensive lead mines. Pop. 29,426.

Almado'var del Campo, a town in La Mancha, Spain, 22 miles S.W. of Ciudad Real. It stands on a spur of the Sierra Morena, at the base of which flows the Vega. Agriculture is the chief employment. Pop. 5620.

Almo'hades, an Arabic word, importing 'Unitarians,' assumed by a dynasty that ruled in Africa and Spain in the 12th and 13th centuries, to assert the superior orthodoxy of their worship. Their founder, Mohammed Ibn-Toumert, born in the Atlas, came forward at first as a religious reformer, and led a very ascetic life. His influence becoming formidable, Ali, King of Morocco, proceeded to check it; but by the assistance of the Arabs and Berbers, Mohammed made himself master of Morocco, Fez, and Tunis. The A. subsequently conquered portions of Spain and Portugal. Abd-ul-Mumen, formerly the lieutenant, became the successor of Mohammed. The dynasty was splendid and powerful till their great defeat by the Spaniards at Tolosa in 1212. Their power in Spain was finally subverted in 1257, and in Africa twelve years later.

Alm'ond. The A.-tree (*Amygdalus communis*) belongs to the natural order *Rosaceæ*, and the sub-order *Amygdalæ*. It was originally a native of Barbary and Morocco, but by long cultivation it has become distributed over almost all the warmer temperate countries of the Old World. There are two varieties of the tree—viz., *dulcis*, yielding the sweet A., and *amara*, yielding the bitter A. The chief kinds of sweet A. are the Valencia, the Italian, and the Jordan; the latter come from Malaga. They are often sold with their brittle endocarps adhering, under the name of shell almonds. The seeds are used medicinally as well as for dessert, but are very indigestible. About 500 tons are annually consumed in Britain. Bitter almonds are imported from Mogadore. They are principally used for the expression of the fixed and distillation of the essential oil contained in them. They are also employed for flavouring purposes, but ought to be used with great caution, as they possess a poisonous principle similar in its effects to prussic acid. About 300 tons are imported into Britain annually. The essential oil of almonds is a virulent poison. This oil does not exist naturally in the A., but is formed by the chemical agency of water, on some of its constituents.

Almonds, Essential Oil of. In bitter almonds there is present a crystallisable body named amygdalin, which is not found in the sweet varieties. The influence of amygdalin on another constituent of almonds, emulsin, causes the formation of the essential oil of A. To develop the essential oil, for it is not present in the natural condition of the kernel, the cake of bitter A. from which the fixed oil has been extracted is macerated in water and submitted to distillation, when the essential oil

forms and comes over. The essential oil consists of a hydride of benzoyl mixed with hydrocyanic acid, benzoic acid, and one or two other substances. It occurs in commerce as a golden-yellow limpid liquid, with an agreeable odour, an acrid, bitter taste, and highly poisonous qualities, on account of the hydrocyanic acid it contains. The kernels of various stone fruits, as well as the leaves of the laurel, *Prunus laurocerasus*, yield the essential oil. It is largely used by perfumers for scenting soap, the flavour of Noyau is owing to it, and it is used in the preparation of puddings, &c. Under the name of essence of mirbane, a chemical preparation, nitrobenzol, having the flavour of essential oil of A., is frequently substituted for the genuine oil, especially in perfuming soap.

Almonds, Fixed Oil of. Both sweet and bitter A. contain a proportion of fixed oil in their composition, the sweet variety having about 54 and bitter A. containing 28 per cent. The oil is precisely the same in both varieties, and may be extracted by pressure. Almond oil contains only a small proportion of the solid constituent margarin, and therefore remains fluid to a very low temperature—25° C. It is a soft yellow oil, with a bland, nutty flavour when fresh, but quickly becomes rancid. It is used in pharmacy chiefly for the preparation of ointments, and generally it is available as a substitute for olive oil.

Alm'oner, the name given at first to a member of a religious order, and afterwards to an ecclesiastic attached to the court of a sovereign, prince, or nobleman, and whose duty is the distribution of alms. In England the *Lord High A.* dispenses the bounties of the sovereign, and is always a high dignitary of the Church.

Almo'ra, the chief town of the British district of Kumaon, India, 87 miles N. of Bareilly, and 155 N.E. of Delhi. It stands on a mountain ridge 5337 feet above the sea, near the source of the Kosia, a tributary of the Ramgunga. It is a military station, and has prospered greatly since it came into British possession. Pop. (1872) 6151.

Almoravides, or **Morabethun**, an Arab dynasty in Africa and Spain in the 11th and 12th centuries A.D. The name, which means 'the champions of religion', was applied to a sect of Mohammedan proselytes originally founded by Abdallah-ben-Yassim, who, descending from the western slopes of the Atlas under Abubekr, conquered Fez and Morocco, and crossing into Spain, under Yussuf-ben-Taxfin, subdued it to the Tagus on the W. and to the Ebro on the E. But the Almohades (q. v.) soon deprived them of their rapidly-acquired possessions both in Africa and Spain, and destroyed their great empire in 1148. The terms *Maravedi* (q. v.) and *Marabitts* (q. v.) still keep their rule in remembrance.

Al'mug or Al'gum Tree. The plant referred to under these names in the Old Testament (1 Kings x. and 2 Chron. ix.) is supposed to be *Santalum album*, the sandalwood of India. The wood, which is fragrant, was brought from Ophir (probably some part of India) by Hiram, and was used to form pillars for the temple and for the king's house, as well as for harps and psalteries. It is employed in China for incense.

Almuñecar (Arab. 'the gorge'), a seaport in Andalusia, Spain, 31 miles S. of Granada. It lies in a rich valley, which, under Moorish cultivation, yielded cotton and sugar. These products have been lately revived, and sugar-refining is one of the chief industries. Pop. 5000.

Al'nus, a genus of trees belonging to the natural order *Betulaceæ*. See **ALDER**.

Aln'wick, the county town of Northumberland, near the mouth of the Alne, on the highroad between Newcastle and Berwick-on-Tweed, 34 miles from the former, and 30 from the latter. It is said to have been founded by the Romans, but its origin is really unknown. In the middle ages it was strongly fortified to resist the frequent attacks of the Scots, and vestiges of its walls and gates still remain. The modern town has a handsome corn exchange and town-hall, but its trade is unimportant. It is the election town for the N. division of the county, and a station on the North-Eastern Railway. At the N. entrance to the town stands A. Castle, the magnificent baronial residence of the Dukes of Northumberland. Pop. (1871) 6218.

Aloe, a Latinised form of an Arabic name, given to a genus of succulent plants belonging to the natural order *Liliacæ*. The species are abundant in all warm countries, and are very tenacious of life. The most important product of the plants is the drug called Aloes (q. v.) The juice of A. was formerly used in embalming dead bodies. Fibre is also obtained from several species. American A. belongs to a different genus and order of plants. See **AGAVE**.

Aloe Fibre, or Pita Flax. See **AGAVE**.

Aloes, or **Bitter Aloes**, the inspissated juice from the leaves of various species of aloe, used in medicine as a powerful purgative. The substance has a dark resinous lustre, and a disagreeable, exceedingly bitter taste. The finest A. come from the island of Socotra; and from Barbadoes, in the W. Indies, another variety, classified as hepatic or dark, according to the colour, is received. The other commercial source of A. is Cape Colony, but its produce is chiefly used in veterinary practice. Messrs T. and H. Smith, of Edinburgh, have introduced into pharmacy a body termed aloin, extracted from A., having similar properties, but possessing the advantages of a definite chemical compound.

Aloes Wood, or **Lign Aloes**, called also Eagle Wood, or Agallochum, is *Aquilaria Agallochum*, a tree of tropical Asia, belonging to the natural order *Aquiliariacæ*. It is believed to be the aloes referred to in the Bible. The wood contains a resin and an essential oil, which is separated and used as a perfume. The Orientals burn the resin in their temples for the sake of its fragrance, and it is also used medicinally. Herodotus states that it once sold for more than its weight in gold.

Alope'cia is partial or general baldness. It is more common in the male than in the female sex. Occasionally there is congenital absence of hair. Baldness in most cases is indicative of loss of vital power, the hair follicles participating in the general weakness of the nutritive functions; but sometimes it is the direct result of disease, such as syphilis. When the baldness is circumscribed into distinct patches, it is called *A. areata*. If the hair follicles have been absorbed or destroyed, baldness is incurable.

Alopecu'rus, a genus of grasses. See **FOXTAIL**.

Alora, a town in the province of Malaga, Spain, 18 miles N.W. of Malaga, on the Guadalherce. It has a ruined Gothic castle, and lies in a district where oil and capital wine are produced. The chief employments are agriculture and the making of soap and sulphate of soda. Pop. 8370.

Alost, or **Aalst** ('to the east'), a walled town of Belgium, on the Dender, a tributary of the Scheldt, 16 miles W.N.W. of Brussels by rail. It is the old capital of E. Flanders, and has some beautiful buildings. The unfinished church of St Martin is a magnificent structure, and contains a celebrated picture by Rubens, 'St Roch beseeching our Saviour to stay the Plague of A.' A. is the birthplace of Thierry Martens, who here (1475) set up the first printing-press in Belgium. It is an active centre of trade, and has extensive iron and copper foundries, distilleries, breweries, cotton-mills, print-works, and bleach-fields. Pop. 19,700.

Aloysia, a genus of plants in the order *Verbenacæ*, to which the lemon-scented verbena (*A. citriodora*) of gardens belongs. The plant, although a native of Chili, thrives well in the open air in Ireland and the S. of England.

Alp, Alb, a mountain chain between the Neckar and the Danube, otherwise called the Rauhe or Swabian Alp, 60 miles long and 12 broad, with an average height of fully 2000 feet, is a plateau, with several intersecting valleys, and belongs almost wholly to Württemberg. The system is calcareous, and abounds



Aloe.

in remarkable cavities. Wine and fruit are produced in considerable quantities in the valley, but the plateau is barren.

Alpaca (*Auchenia Paco*). The A., or paco, of Peru forms a species or variety of Llama (q. v.), which genus represents the Eastern camels in the New World. By some authorities the A. is regarded as a distinct species, and is named as above; by others it is accounted a mere variety along with the vicugna (*A. vicunia*) and the guanaco (*A. guanaco*). The A. is of smaller size than the llama, and although never employed as a beast of burden, is yet largely bred and domesticated in Peru for the sake of its long silky wool, large quantities of which are imported into



Alpaca.

this and other countries for the manufacture of various fabrics. In size it resembles a large sheep, the neck being more elongated, however, its eyes larger, and its movements more lithe and active. The colour is in general a yellowish brown, but it varies to grey or even white, or may exhibit a hue almost approaching black. Its habitat is in the mountainous tracts of Peru and Chili, but it occurs both to the N. of these limits and southwards to Patagonia. The alpacas are gregarious in habits, and in a wild state are timid and wary. Attempts to naturalise the A. in Britain, and Europe generally, have not been successful, chiefly on account of the want of sufficient enterprise. As in all the llamas, no humps exist, and the toes are completely separated. The A. wool is chiefly manufactured at Bradford in Yorkshire. In 1863 Peru furnished 2,772,836 lbs., whilst New Granada exported 622,889 lbs., and other S. American countries 6857 lbs.

Alp Arslan ('brave lion'), whose proper name was Mohammed Lhaz-ed-Din-Abu-Chuja, was the second Seljukide sultan, and was born in Turkestan about 1028 or 1030. He ascended the throne of Khorassan in 1053, on the death of his father Daoud, and ten years later succeeded his uncle, Toghrul Beg, the first of the Seljukide sultans. The military force belonging to his great dominion he employed first (1064) in suppressing a revolt in Azerbaijan, where he defeated the rebel chief Kutulinish near the city of Rei; he then (1065) followed on a course of victory and conquest into Transoxiana. He next (1067-68) proceeded against the Greeks, by whom the Turks had been several times driven back beyond the Euphrates. A fierce battle was fought between the towns of Van and Erzeroum in August 1071. The Greeks were defeated, and their gallant emperor, Romanus IV., surnamed Diogenes, taken prisoner. The ransom he paid was equivalent to £1,000,000 sterling, with an annual tribute of £160,000. A. was assassinated 15th December 1072 by Jussuf Cothul, commander of the fortress of Berzem, in Turkestan.

Alpes, Basses ('Lower Alps'), a frontier department in the S.E. of France, formerly part of Provence, with the Hautes A. on the N. and the A.-Maritimes in the S.E. Fruit grows abundantly in the S., and the wines are celebrated, but in the N. the surface is nearly barren. The chief town is Digne (pop. 3720), which, like Gréoulx, has hot springs. The B. A. produces lead and green marble, and is watered by the Durance. Area, 2680 sq. miles; pop. (1872) 139,332.

Alpes, Hautes ('Upper Alps'), a frontier department of France, occupies the S.E. part of Dauphiné. It is the highest department in France, and is traversed by the Cottian Alps, which, in Mount Pelvoux, reach an altitude of 14,000 feet. The soil is wretched, and the climate severe for France. Unless in some southern valleys, it yields only potatoes, rye, oats, and barley. It is rich, however, in lead, copper, iron, and anthracite. The chief town is Gap (q. v.) Area, 2136 sq. miles; pop. (1872) 118,898.

Alpes-Maritimes, a department in the extreme S.E. of France, separated from Italy by the mountain range of the same name. In the mountainous country to the N. immense flocks and herds are reared, and especially a celebrated breed of goats. In the fertile southerly valleys flourish the vine and olive, and also oranges, lemons, and figs, while tobacco is successfully cultivated. Many of the inhabitants, along the shores of the Mediterranean, are engaged in the tunny, anchovy, and sardine fisheries. The silk-worm is extensively reared, and there is considerable manufacture of perfumes and bijouterie.

The capital is Nice (q. v.) The A. was formed by the union of a portion of the department of Var with Nice, formerly a part of Sardinia, ceded to France in 1860 by the treaty of Zurich. Area, 1680 sq. miles; pop. (1872) 199,037.

Alphabet is a term applied to the collection of symbols which are used to express the various sounds that occur in a language. It is derived from *alpha*, *beta*, the names of the two first letters in the Greek language, and therefore corresponds exactly to our A B C.

There can scarcely be a doubt that pictures were first employed to indicate words; that these pictures became more and more indistinct in the lapse of time, but still remained symbols of words; and that it was only at a later stage that the sounds of words were analysed into their simplest forms, and separate symbols employed for each. Indeed, at the present day some languages have symbols only for words. In Chinese this is the case, and in that language there are upwards of 50,000 different symbols. A fourth of these is obsolete, and a half of the remainder rarely occur, or are mere variations and antiquated forms. There are 204 signs employed to indicate the pronunciation of the words to which they are attached, called *keys* or *root-signs*. The hieroglyphics of Egypt were also originally pictorial and indicated words.

The symbols of our A. are derived from the Phœnician. Some scholars think that the Phœnician A. itself was derived from the Egyptian hieroglyphics by a process of decay or loss. Substantially the same symbols as the Phœnician are used in Hebrew, Syriac, Arabic, Greek, Latin, Coptic, Gothic, German, English, and several other languages. The names of the letters show that they were originally pictures. In the case of the first, for instance, an ox would be represented, but it is possible that only such portions of the ox would be given as would be necessary to identify it. The symbol would indicate the sound of the word denoting the animal, then possibly only the first syllable of the word, and finally only the first letter.

Each A., and indeed each letter, has a history of its own. We leave the fuller account of the letters to the articles on each letter. Here we have to notice that the A. varied at different periods in the number and symbolic force of the letters. Thus there can be no doubt that the forms of the Hebrew letters now used belong to a late period. We know that the Greek A. has lost some letters and gained others. The *Digamma*, for instance, disappeared. In the earliest Greek inscriptions H is the rough breathing, and the long vowels *Eta* and *Omega* do not occur. In fact, tradition stated that the Greeks derived only sixteen letters from the Phœnicians, and that letters were added in at least two subsequent periods. Though this tradition is not strictly accurate, since it is quite apparent that more than sixteen letters were derived from the Phœnicians, it is correct in regard to the additions. In the Latin A. the letter C represented the two sounds of *k* and hard *g* at the time of the Decemvirs, and it is possible that the two sounds were so uttered as not to be clearly distinguishable. In the process of time K passed out of use, occurring only in a few words. C was employed for the *k* sound, and a new symbol, *g*, was introduced to express the hard *g*. This new symbol first appears in a Latin inscription dating shortly after 290 B.C. At the time of Cicero there were twenty-one letters in the Latin A. The letters *s* and *y* were regarded as foreign, and used only in transferring Greek words into Latin.

The names given to the letters by the Phœnicians were not representatives of the sounds. The Greek names were borrowed from the Phœnician. The practical Romans seem to have been the first to name the letters from the sounds. The vowels they called by their powers, as we do, *a, e, i, o, u*. To *f, l, m, n, r, s, x*, they prefixed the sound of *c*, and called them *cf, cl, cm, cn, cr, cs, cx*. The last was also called *ix*. The vowel *e* was added to *c, g, p, b, t, d*, thus giving them the names *ce, ge, pe, be, te, de*. *k* and *h* were named *ka* and *ha*, and *q, gu*. We have increased the number of the letters by making two letters of *i, j* and *j, v*, and two of *u, u* and *v, w*. If we examine the A. by the light of its history, it seems probable that the order of the letters in the A. was based on a classification of sounds. The first letter was a breathing, and still is in Hebrew, but a vowel in Latin and Greek. Then come in Hebrew and Greek the three *media* *b, g, d*, and we have seen that the *c* of the Latins originally stood for

the *g*. Then came another breathing in Hebrew, formed into the vowel *e* in Greek and Latin. Then followed the three aspirates in the same order as the *media f, h, th*. The *f*, or *Digamma*, disappeared from the Greek, the *h* became the symbol for the long *e*, and another symbol, *χ*, was used for *ch*. In Latin the *g* was inserted, as mentioned above, and the *th* was not adopted. In Hebrew and Greek a sibilant was introduced into the group. Then comes another breathing in Hebrew, and the vowel *i* in Greek and Latin. This is followed by the liquids *l, m, n*. The *k* seems to be of later introduction in all the three languages; a sibilant appears in Hebrew and Greek. Then comes another breathing in Hebrew, represented by the vowel *o* in Greek and Latin. And this was followed by the three tenues in the same order as the aspirates and *media p, k, t*. In the Greek the letter representing the *k* sound has disappeared. It had the name of *Koppa*, and is found in early inscriptions. It takes the form of *q* in Latin. The insertion of the liquid *r* and the sibilant *s* may have been later. Some points of this explanation may be open to question, but enough is absolutely certain to show that the invention of our *A*, followed a principle.

No language that exists has an *A*. that accurately expresses all the sounds contained in it. Various efforts have been made in modern times to attain this result, and Mr Bell has been remarkably successful in his 'Visible Speech.' But this object will be found discussed under PHONETICS.

Alpheius, the modern Rofia, the largest river of the Peloponnesus, rises in the S. E. of Arcadia, and after flowing through Elis, past the famous scene of the Olympic games, falls into the Ionian Sea. As it disappears several times in the limestone mountains of the country which gives it birth, it gave rise to a beautiful myth, which has been immortalised by the muse of Shelley. *A*, the river-god, becoming enamoured of the nymph Arethusa, pursued her from Greece to Sicily without intermingling his waters; and as at Ortygia (Syracuse) a copious fresh-water spring entered the sea close to where another spring bubbled up under the salt water, these were fabled to be *A*. and Arethusa.

Alpine Clubs are societies intended to promote, by means of travel and field-work, a scientific investigation of the great European mountain system. The first of these clubs was that founded in London in 1858, and which has issued several interesting and important works, the chief of which are—*Parks, Passes, and Glaciers* (3 vols., Lond. 1859-62); the *Alpine Guide* (3 vols., 1863-67); and the *Alpine Journal*, published since March 1863. The independent publications of leading members, being professedly due in part to the influence of the club, may also be here referred to, as *Glaciers of the Alps* (1860), and *Hours of Exercise in the Alps* (1871), by Professor Tyndall; the *Playgrounds of Europe* (1871), by Leslie Stephen; and *Scrambles in the Alps* (1871), by Edward Whymper. The English Alpine Club was followed by the establishment of similar societies in Austria (1862), Italy (1863), Switzerland (1863), and in Germany (Munich, 1869).

Alpine Farming. The mode of farming pursued in the wilder regions of the Alps shows that the peasants are not only very industrious, but by no means devoid of practical knowledge. Doubtless it is intuitive, but no better mode could be proposed or practised by the most skilled farmers in Europe. Except in the valleys of the Alps arable husbandry is impossible, so that pasturage and haymaking are the only sources of profit open to those who depend upon the soil for sustenance. At the lower levels of the mountainous range, above the flat country, the land is broken up by the plough in order to make hay, which is to serve for the winter fodder of cattle. These are pastured in summer in a rotative way, which is very judicious. Summer begins in May, when the cattle are placed upon the lowest of the three stages forming alpine pasture-grounds. They crop the herbage upwards, through the Middle Alps to the Upper Alps, where they finish about the end of July, and they are thus always kept in a progressive state. Then the animals, having cropped this higher grass, are marched down the hill again, eating as they come, and after about twenty weeks' absence arrive at the place of starting, when the hay, top-dressed by their own manures, is ready for them. This has been gathered in the interval of their mountainous feeding. Hay has been cut on ledges which even the

adventurous goat fails to reach, and thrown over precipices to be picked up below. The milk of the cows is converted into cheese. Huts at various stages exist for the cattle-tenders, whose start in spring and return in autumn are signalled by popular festivals.

Alpine Plants. This appellation is generally given to those plants found at a considerable elevation on mountains, or those which occur near the snow-line. This line varies much in different countries, according to the latitude. On the mountains near the equator many plants are met with at an elevation of 12,000 to 15,000 feet above the level of the sea, which have a resemblance to those met with on the Swiss and German Alps about 6000 or 7000 feet, as well as those on the low hills of Lapland, and those found on the sea-shore in Siberia. The zone of *A. P.* in Central Europe ranges from 4500 to 9500 feet above the sea, and is characterised by dwarf rhododendrons, such as *R. hirsutum*, the rose of the Alps, blue gentians, saxifrages, &c. On the Scottish mountains this zone is from 2500 to 4000 feet. Its flora is marked by such plants as the drooping bulbous saxifrage (*S. ceruina*), a species only found on Ben Lawers, in Britain, the rock whitlow-grass (*Draba rupestris*), the alpine forget-me-not (*Myosotis alpestris*), the alpine speedwell (*Veronica alpina*), the trailing azalea (*A. procumbens*), the alpine gentian (*G. nivalis*), the alpine sedge (*Carex frigida*), discovered as new to Britain in 1874, and the round-leaved Woodsia (*W. hyperborea*). Many *A. P.* are much restricted in their distribution, and some are even confined to a single locality, such as *Hypericum coris*, a species of St John's wort, found on the Wiggis mountain in Switzerland, and *Salix Saileri*, a dwarf willow on a mountain at the head of Glen Callater, in Scotland, where it was discovered in 1874.

Alpinia, a genus of plants belonging to the Ginger family. See GALANGALE.

Alpnach, a village in the canton of Unterwalden, Switzerland, on a bay of Lake Lucerne called Lake A., near the base of Mount Pilatus. It was notable for the 'slide,' 2500 feet long, by which, in former times, timber was conveyed from the hill-top. Pop. 1600.

Alps (Celtic, *alb* or *alp*, a craggy height, probably connected with Lat. *alb*, *albus*, white, see ALBANY), the greatest mountain system of Europe, resting upon a basis of 90,000 sq. miles. They extend from the valley of the Rhone in France on the W., to the plains of Hungary on the E.; on the N. they include a large part of Switzerland and the upper regions of the Danube, and on the S. are bounded by Italy and the Adriatic Sea. They stretch from the 6° to the 20° E. long., and while in some parts touching 43° N. lat., lie principally between the parallels of 46° and 48° N. lat. The length of the main chain is about 692 miles, the breadth varies greatly.

Divisions.—The *A.*, both in ancient and modern times, have been divided into numerous ranges bearing distinct names. The following is a convenient classification, embracing at least all the most important divisions. I. The *West A.*, including—1. The Maritime *A.*, between France and Italy, from the Mediterranean to about 44° 50' N. lat.; 2. the Cottian *A.*, to the N. of the Maritime *A.*; 3. the Graian *A.*, between Piedmont and Savoy. II. The *Middle A.*—1. The Pennine *A.*, between Lombardy and the Rhone Valley; 2. the Lepontine or Helvetic *A.*, in the S. of Switzerland; 3. the Rhaetian *A.*, in the Grisons and the Tyrol; 4. the Bernese *A.*, in Switzerland, between the Rhone and the Aar, N. of and parallel to the Pennine range. III. The *East A.*—1. The Noric *A.*, in Salzburg and Styria, Austria; 2. the Carnic *A.*, between Austria (the Tyrol and Carinthia) and Italy (Venetia); 3. the Julian *A.*, extending from Carinthia, through Carniola, to the Adriatic Sea.

Elevation.—The Middle *A.* are the most elevated, reaching in their highest summit, Mont Blanc, in the Pennine range, which is also the highest summit in Europe, a height of 15,783 feet. In the same range are Monte Rosa, 15,200; the Matterhorn or Mont Cervin, 14,780 feet, &c. In the Lepontine *A.* the St Gothard is about 12,000 feet in height. In the Bernese *A.* Finsteraarhorn is 14,000 feet, and Jungfrau 13,700. In their lowest passes the Middle *A.* have an elevation of about 6000 feet. The *West A.* vary from 4000 feet in the lowest pass to 13,500 feet. Aiguille de Chambeiron, 11,155 feet, and Grand Rioburent, 14,165, in the Maritime *A.*; Monte Viso, 12,600 feet, in the Cottian *A.*; Mont Iséran, 13,372 feet, and Mont Cenis,

11,460 feet, in the Graian A., are among the chief summits in this range. The East A. attain the height of 12,000 feet in Gross-Glockner, in the Noric A. Mont Terglu, in the Julian A., is 9370 feet. They possess passes as low as 3500 feet.

Passes.—There are in the A. at least sixty passes which can be crossed by carriages. Three railways, including that through the famous Mont Cenis Tunnel, cross them, and others are in process of construction. The chief passes are those of Mont Genève, over the Cottian A.; Mont Cenis, Mont Iséran, and the Little St Bernard, over the Graian A., all forming lines of communication between the S.E. of France and Piedmont; the Great St Bernard, over the Pennine A.; the Simplon, between the Pennine and Lepontine A., both connecting the valley of the Rhone with the N. of Italy; and the St Gothard, over the Lepontine A., in the line of route from Lucerne to Lake Maggiore; the Splügen, the Brenner Pass, and the Wormser Joch or Orteles Pass, in the Rhetian A., by which intercourse is kept up between Lombardy and the S.W. of Austria. The roads across the East A. are much lower and more numerous, and do not require special mention. They connect Venice with the whole S.W. of Austria.

Geology.—The oldest rock formations of the A. are generally primary crystalline. The central ranges are in a great measure composed of the crystalline rocks, gneiss, mica-slate, talcose-slate, and others of a similar kind. The gneiss often contains large crystals of felspar or albite, and among the many minerals enclosed in the mica-slate garnets are most abundant. In the Eastern A. there are vast deposits of grauwacke and clay-slate above the primary formations. An enormous mass of calcareous matter, intermixed with argillaceous schists and sandstones, rests sometimes on one, sometimes on another, of the strata already mentioned. The Julian A. consist chiefly of the Jurassic and chalk groups.

Minerals.—Gold and silver are found in the Tyrol, Salzburg, and Carinthia; silver also in Styria, Illyria. Carinthia, Illyria, and Carniola yield large quantities of iron. Copper is found both in the French and Austrian A. The Bleiberg of Carinthia produces some of the best lead in Europe. The quicksilver of Idria, in Carniola, and the rock-crystal of St Gothard are world-renowned. Anthracite coal is also found, in the greatest quantity, in the Austrian A.; and salt is generally plentiful, especially at Hall in the Tyrol, and Hallein in Salzburg.

The **vegetation** of the A. differs considerably from that of the plains beneath, and on the range itself great variety is caused by the climatic effects of the different elevations. The vine, chestnut, oak, spruce fir, beech, pine, maize, &c., all grow vigorously at the foot of the A. The vine and maize disappear, however, at an elevation of about 2000 feet. The chestnut survives for 1000 feet higher. At a height of 4000 feet the beech and oak cannot maintain themselves. At 6000 feet the spruce fir is the only tree remaining, and it is only found higher on the S. side of the system. Between 6000 feet and the snow-line (8000-9000 feet) is the region of mountain pasturage, where the Alpine Farming (q. v.) is carried on. The beauty and abundance on the A. of the flora peculiar to elevations near the line of perpetual snow is sufficiently indicated by the name Alpine Plants (q. v.), applied to this form of vegetation in any part of the world.

Animals.—The ibex or bouquetin, white hare, the wild goats (rare), and chamois inhabit the highest regions of the A., the last sometimes descending to the woods, which also contain bears, marmots, and moles. Wolves, foxes, lynxes, and wild cats are abundant still lower down. Cows and goats are the most numerous among domestic animals, and in summer are driven up to the mountain pastures already alluded to. The dogs of St Bernard (q. v.), kept for seeking travellers lost in the snow, deserve mention. Among the birds are the lammereyger, or great vulture of the A., eagles, and other birds of prey, while partridges and bustards are found below the snow-line, quails and partridges in the lower regions. The lakes of the A. contain grebes, palimpedes, and trout, though in a few there are no fish. Insects are abundant as high as vegetation extends.

Water System.—The five principal rivers whose basins make up the water system of the A. are the Rhine and the Danube, which either directly, or through their affluents, drain the Bernese, Rhetian, and Eastern A.; the Po, which flows out of the Western A., and drains the whole plain of Lombardy; the Rhone, which receives the waters from the N. side of the

Pennine and the S. side of the Bernese A.; and the Var, which is the principal stream of the Maritime A.

General Features.—The A., in their general outline, form a grand sweep round the N. of Italy, one end of the curve being in the valley of the Rhone, the other lying in the kingdom of Hungary. Lakes border both the northern and southern bases of the mountains, and valleys of great variety of form open out in all directions. Alpine scenery is wonderfully grand and diversified. Snow-covered peaks, icy glaciers, sheer precipices, and mountain torrents lend the element of grandeur to the picture, while the softer side is supplied by the glassy surfaces of the lakes and the beautiful tints of the alpine flora. Some of the glaciers are of immense size; the Mer-de-Glace, on the northern slope of Mont Blanc, is 12 miles long, 5 miles wide, and from 80 to 180 feet thick. The summits of the A. generally taper away in the form of a peak, which, in the loftiest mountains, is covered with perpetual snow. The mountains of chalk formation are distinguished by their rounded summits.

Alpujarras (a Spanish corruption of an Arabic word meaning 'grass'), the name of a range of mountains and the surrounding region in the S.E. of Spain. The range runs W. and E. parallel to the Sierra Nevada, from Motril to the river Almería. The district extends from the Mediterranean on the S. to the Sierra Nevada on the N. The N. slope is remarkable for its splendid pasturage, but the S. part is precipitous and barren, with the exception of the valleys near the sea, which enjoy a tropical climate, and are very populous. The highest peaks have an elevation of 7000 feet. Lead, antimony, and silver are obtained. The inhabitants, who still retain traces of a semi-Moorish origin, are chiefly shepherds and vine-growers.

Alsace-Lorraine (Ger. *Elsass-Lothringen*), a German province lying between Baden and the Vosges in the S., and between French Lorraine and the river Saar in the N. It is fertile and well watered, has large manufactures of machinery, leather, sugar, paper, tobacco, and beer, and is rich in iron, lead, and other metals. It is divided into the districts of Upper Alsace, Lower Alsace, and Lorraine, with a total area of 5603 sq. miles, and a pop. (December 1, 1871) of 1,549,738, of whom about 1,350,000 are German-speaking. Lorraine is separated by the Vosges from the N. of Alsace, and lies to the N.W. of it. The chief towns are Strasburg, Colmar, Mühlhausen, Metz, and Hagenau. Alsace belonged to Germany till 1648, when part of it was ceded to France; the rest was seized (1681) by Louis XIV. German Lorraine, so-called, is only that part of Lorraine (q. v.) lying between Metz and the Vosges, where the German language has always been spoken. A. was the first part of France occupied by the Germans in the Franco-Prussian war, and was permanently ceded to the German empire by the treaty concluded at Frankfurt-on-the-Main, May 10, 1871. It was placed under military government till January 1, 1874, when it came under the immediate jurisdiction of the empire, returning fifteen members to the German parliament. Its annexation was generally resented by the inhabitants, of whom some 45,000 withdrew from the territory, declining to become German subjects. Of these, 4200 emigrated to Algeria, where they received from the French government a grant of 100,000 hectares of the best land. See Schmidt, *Elsass und Lothringen: Nachweis wie diese Provinzen dem deutschen Reiche verloren gingen* (3d ed., 1871); and Auerbach, *Wieder unser* (1871).

Åsen (the Ger. form of the Dan. *Als*), an island formerly belonging to Denmark, now included in the Prussian province of Slesvig-Holstein, lies in the Little Belt, lat. 54° 46' N. long., 9° 52' E. It is nearly 20 miles long and 12 broad, with an area of 121 sq. miles, and is richly wooded, abounding in fruit-trees. The chief town is Sonderburg (q. v.) Pop. of A. (December 1, 1871) 23,500.

Alsophila, a genus of ferns, many of the species of which form magnificent trees. They are all natives of tropical countries and islands. In Norfolk Island *A. excelsa* grows to 70 or 80 feet high, with large palm-like fronds.

Ålster, a river of Holstein, with a course of about 30 miles, at whose confluence with the Elbe is situated Hamburg (q. v.)

Alstonia, a genus of plants named in honour of Alston, at one time professor of botany in the University of Edinburgh. They belong to the order *Apocynaceae*, and are all natives of

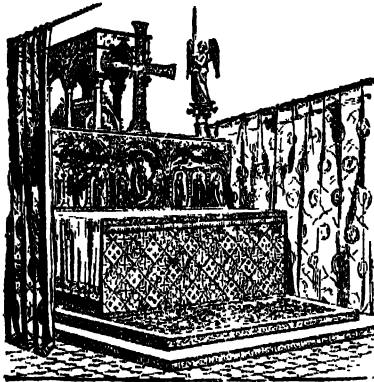
tropical countries. *A. scholaris*, or Pali-mara, is a large Indian tree with bitter milky juice. Its bark is also intensely bitter, and is used as an astringent in bowel complaints. Its wood is whitish, even-grained, and easily worked, and used for furniture, boxes, &c.

Alströmëria, a genus of plants of the order *Amaryllidaceæ*, natives of S. America. Their leaves are remarkably twisted, so that what should be the upper surface becomes the lower. Many handsome species are grown in gardens. *A. aurea*, *A. flos Martini* (the St Martin's flower of Chili), *A. ligtu*, and *A. psittacina* are very showy plants. The farinaceous tubers of *A. salicilla*, of the W. Indies, as well as those of *A. ornata* and *A. pallida* of Chili, are used as food.

Altai in Turkish, **Kin-Shan** in Chinese—i.e., 'gold mountains'—is the name given to an important range in the E. of Asia, separating the Russian and Chinese empires, and the most northern of the four parallel chains that form the skeleton of the central plateau. It runs in an E. and W. direction between 84° and 100° E. long., and in about 50° N. lat. The range is intersected by wide valleys, through which numerous rivers flow. The highest peak attains the height of about 12,800 feet, far above the snow-line. The climate of the A. is less severe than might be inferred from its position, and comparatively little snow falls in winter. The A. is very rich in minerals, including gold, silver, lead, and marble. The most valuable silver mines in the Russian empire are in this range of mountains. The annual yield of gold since 1853 has been about 50,000 lbs. There are large forests of cedars, firs, larches, &c. Stags, hares, wolves, wild sheep, and bears abound. Jasper, red porphyry, and granite enter largely into its geological formation.

Altamura, a town in the province of Bari, S. Italy, and capital of a division of the same name. It lies in a rich country at the base of the Apennines, producing abundantly oil and wine, and has a fine cathedral. It is reckoned one of the most beautiful towns of Apulia. Near A. stood the ancient *Lufazia*. Pop. of commune, 17,198.

Altar (Lat. *altare*, from *altus*, high), a raised or elevated place on which offerings to a Divine Power were laid. It was a conspicuous and necessary feature both of the Jewish and heathen systems of worship. The first A. of which we read in the Bible is that erected by Noah on leaving the ark, but altars are frequently mentioned in the incidents of patriarchal life. After the giving of the law, the Israelites were commanded to make an A. of earth; and in the later history of the people we find that it became customary to build them in high places, a practice, however, condemned by the Mosaic law, probably as



Altar.

associated with the Syrian idolatries. The only lawful, authorised, and permanent altars among the Israelites were the two belonging both to the tabernacle and the temple, the A. of burnt-offering, and the A. of incense, descriptions of which are given with great minuteness in different parts of the Pentateuch. As regards shape, Jewish altars followed the Oriental type, and were either square or round, like those of the Assyrians, Babylonians, Persians, &c., while Greek and Roman altars were mostly round. The word, but not the thing passed into the language of the Christian Church. It there denoted the com-

munion-table, and does so to this day wherever the term is employed. A variety of expressions are used by the Fathers to indicate the solemnity and sanctity of the place on which were laid the emblems of the mystery of the Divine Sacrifice. It is called the mystical and tremendous table, the mystical table, the holy table, &c. Up to the close of the 2d c. it was nothing more than a simple table, at which the Agapæ or the Eucharist was shared, and on which the offerings of the congregation were placed. The recognition of Christianity as the state religion by Constantine in the 4th c. enabled the Church to import more pomp and ceremony into public worship, and henceforth altars were no longer used as supper-tables, but consecrated and set apart for eucharistic purposes, or for receiving and hallowing the offerings of devotion.

Alt'dorfer, Albrecht, painter and engraver, born at Altdorf, in Bavaria, 1488, died at Ratibon in 1538. He was probably a pupil of Albert Durer, to whom several of his works have been erroneously attributed. Alexander's battle of Arbela, now at Munich, is his masterpiece. It has not been engraved, the number and minuteness of the figures presenting exceptional difficulties. As an engraver on wood he is inferior to Dürer alone; but his works on copper and pewter are by no means of equal excellence.

Altea, a seaport of Valencia, Spain, 25 miles N.E. of Alicante. It stands on an elevation at the mouth of the Alga, and manufactures linen fabrics, soap, and ropes. Pop. 5502.

Altén, Karl August, Count von, a distinguished Hanoverian soldier, born at Burgwedel, 20th October 1764. After acting with credit at the siege of Valenciennes and at Hondschooten, and obtaining the rank of first lieutenant, he came to England, where in 1803 he was appointed to the command of the first light battalion in the German Legion. Among other services he covered Moore's retreat at Corunna (1809). He distinguished himself greatly in the Peninsular war, and in 1812 he commanded 30,000 men near Madrid. At Waterloo he contributed much to obtain the victory, and was, on his return to Hanover, appointed War-Minister and Minister of Foreign Affairs. He died at Botzen, in the Tyrol, April 20, 1840.

Alténa, a town in the government of Arnberg, Westphalia, 40 miles N.E. of Cologne. It lies in the picturesque valley of the Lenne, and is overlooked by a famous old castle. A. is noted for its extensive manufacture of small articles of hardware. Pop. 7150.

Altenburg, the capital of Saxe-Altenburg, Germany, lies about 24 miles S. of Leipzig, on the Saxo-Bavarian Railway. It has considerable manufactures in hosiery, brushes, and cigars, and an extensive book trade. The old castle of A., which stands on a precipitous rock, is celebrated as the scene of the notable event in German history known as the Prinzenraub (q. v.) Pop. (1872) 19,966.

Altengard, or **Alten**, a seaport in the province of Finnmarken, Norway, stands near the mouth of the Alten, 88 miles S.W. of the North Cape. It has considerable trade in fish, skins, oil, and copper. The climate is mild for so high a latitude, but there is little cultivation. An annual fair held at A. in November is largely attended by Lapps, Swedes, and Finns. Pop. about 1000.

Alten-Ötting, or **Altötting**, a village in Upper Bavaria, pleasantly situated near the river Inn. The church of St Ruprecht, built on the site of a heathen temple in 696, possesses a wonder-working image known as the *Black Virgin*, which attracts crowds of Roman Catholic pilgrims from Bohemia, Swabia, and Austria. In another chapel, called Tilly's or Peter's Chapel, the great soldier has found a resting-place. Pop. (1872) 2664.

Alteratives, a term used in therapeutics to denote certain remedies which are supposed to have the property of altering the physiological condition of tissues, organs, or secretions. It is a vague term, clouding ignorance. As examples of A. may be mentioned mercury, arsenic, and iodine.

Alter'nate, in botany, means where leaves or buds are placed on opposite sides of the axis on a different level, or where the parts of the flower A. with each other.

Alter'nate Angles, in geometry, are the interior angles formed on the opposite sides of a straight line, when it intersects two other straight lines.

Alternation of Generations, or Metagenesis. A term formerly used in zoology, emanating from Stenstrup, and employed to express the idea of the progeny of one animal differing materially from the parent, and that the young of this second generation came in turn to resemble the original parent stock. One generation *alternated* in this way with another, or, to use Camisso's expression, 'the young did not resemble the parents, but the grandparents.' Thus, from a fixed, tree-like zoophyte, a creature like the free-swimming medusa, or jellyfish, may be seen to be developed and detached. This progeny does not in the least resemble the parent zoophyte. And from the eggs of this medusa, a zoophyte is again produced—the zoophytic generation alternating with the medusa generation. Or, as in the case of the *Salpæda*, belonging to the *Tunicate* mollusca, a solitary salpa gives rise by budding to long connected chains of individuals, whilst the chain-salpæ produce only single and solitary forms.

The employment of the above term, and the ideas involved in it, sprang from the fact that naturalists formerly and erroneously regarded the alternating forms as *distinct* and *specific* animals. The zoophyte was thus considered as representing a distinct animal, and the mutually-reproducing jellyfish as another and specifically separate being. But closer study of these phenomena has shown that such is not the case. Only one animal form is engaged in the process—that is, the zoophyte, to cite this case as an example. The jellyfish, or medusa, is not a second or separate animal, but merely a peculiarly-developed, reproductive member, or zooid, of the zoophyte colony; and the whole process merely exemplifies a complicated series of reproductive phenomena, involving a single animal. Similarly, the chain-salpa may be regarded as the single animal form; the separate and single salpæ being merely modified zooids derived from the parent stock. The term A. of G. should therefore be discarded as erroneous, since no 'generations' of animals, as implied by the term, are involved. The process is merely one in which *true reproduction* by means of eggs—as produced by the medusa or chain-salpa—*alternates* with another process of *reproduction by budding*, as seen in the growth of the zoophyte, or in the budding of the single salpa.

Althæa, a genus of plants belonging to the Mallow family (*Malvaceæ*). The common marsh-mallow (*A. officinalis*, q. v.) is found in England and throughout Europe. The roots are used in pectoral complaints under the name of *guimauve*; they form an agreeable demulcent. *A. rosea*, of China, is the origin of the common garden Hollyhock (q. v.); its leaves yield a blue colouring-matter.

Altitude, in astronomy, is the angle or elevation of a heavenly body above the horizon, and is measured by means of a telescope attached to a graduated vertical circle, which rotates upon a similar horizontal circle, so as to allow the pointing of the telescope in any direction. The observed A. must be corrected for Parallax (q. v.), for Refraction (q. v.), and in certain cases for the dip of the horizon.

Al'to, the lowest class of voice among women and boys, its compass lying between the G or F below middle C, and the upper F in the treble staff. A high A. voice has a compass almost identical with that of a mezzo-soprano, but its quality is quite distinct.

Alt-Ofen, a town in Hungary, on the Danube, 2 miles above Ofen or Buda, of which it is almost a suburb. It is said to be the Roman *Sicambria* or *Aquincum*, and contains many monuments of antiquity. Pop. 16,000.

Al'ton, an old market town in Hampshire, England, 17 miles N.E. of Winchester. It lies on the Wey, in the heart of a rich hop-growing country, and is celebrated for its ale. The church of A. contains a fresco painting of Henry VI., in whose reign it was built, and is surmounted by an old Norman tower. Pop. (1871) 4092.

Al'ton, a flourishing town and port of entry in Illinois, U.S., on the Mississippi, 3 miles above its confluence with the Missouri. It is connected by railway with St. Louis and Chicago, and lies in the centre of a fertile country, rich in coal and limestone. A. has a Roman Catholic cathedral. Pop. (1870) 8665.

Al'tona, the most important city in the German province of

Slesvig-Holstein, stands on the right bank of the Elbe, and is now in reality a vast suburb of Hamburg. It has a healthy situation, and is a favourite resort of pleasure-seekers, containing numerous theatres, music-halls, gardens, and cafés. Its rich trade, forming part of that of Hamburg, extends to all parts of the world; it has also extensive tobacco-manufactories, cotton-mills, sugar-refineries, glass-works, and distilleries. It is connected by rail with Kiel, Rendsburg, and Glückstadt, and as a free port enjoys many privileges. It has attained its present importance only of late years, and is still rapidly increasing. Under the care of the late H. C. Schumacher, the observatory of A. acquired a wide reputation. Pop. (1872) 74,102.

Altoona, a city in Pennsylvania, U. S., at the base of the Alleghanies, 244 miles W. of Philadelphia. It was founded in 1849, and has extensive machine-works in connection with the Central Railway. Pop. (1870) 10,610.

Al'torf, the chief town in the Swiss canton of Uri, lies on the Reuss, 2 miles S. of the Lake of the Four Forest Cantons, at the foot of the Grunberg, on the St Gothard road. It has the oldest Capuchin monastery in Switzerland, and is notable as the scene of the shooting of the apple in the legends of Tell. Almost completely destroyed by fire in 1799, it has since been rebuilt in a modern style. Pop. (1870) 2724.

Alto-Rilievo (Ital. in high relief) denotes the degree of projection of a sculptured figure or ornament from the surface or background to which it is attached.

The gradations in relief in sculpture are expressed by *alto*, *mezzo*, and *basso rilievo*. When the object projects more than one-half of its thickness above the slab on which it is formed, or stands out in full relief without being entirely detached, the term *alto-rilievo* is employed; a slight projection is designated *basso-rilievo* (low relief); and relief to the extent of one-half, *mezzo* or *semi rilievo* (middle or half relief). The reliefs executed by the early civilised nations of antiquity may for the most part be classed as *basso-rilievi*, and are remarkable more for colossal proportions than for dignity of expression or graceful form. Sculptured slabs from Nineveh, Babylon, and Persepolis, as well as those of more recent times, amply attest the correctness of defining bas-reliefs as 'sculptured painting,' from the capability of disposing of groups of figures, and exhibiting minor adjuncts, as in a painting. *Messi-rilievi*, also from the above localities, are now in the British Museum, and display considerable boldness and freedom of execution. To the Greek nation must be accorded the honour of bringing sculpture to its highest perfection, and that nation had but reached the zenith of its splendour when Phidias and his disciples executed the reliefs which adorned the metopes of the Parthenon at Athens. These *alti-rilievi*—the finest extant—are preserved in the British Museum. Simplicity, symmetrical proportion, fulness of life and spirited action, combine to make these reliefs unrivalled and unapproachable models for all time. The importation into this country of the 'Elgin marbles,' of which the metopes of the Parthenon formed a part, afforded means of studying antique models, and gave an impetus to the modern school of sculpture. The labours of its chief exponents, Thorwaldsen, Flaxman, Canova, and others, indicate the proper path of study, and have given to works in relief their true and simple character.



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Al'trincham, a market town in Cheshire, England, near the Mersey, 8 miles S.W. of Manchester. Its healthy situation on Bowden Downs makes it a great resort of invalids. Pop. (1871) 8478.

Alum is a crystalline compound containing the metals aluminium and potassium together with sulphuric acid and water.

A. is prepared in this country from a bituminous shale containing iron pyrites, FeS_2 , interspersed throughout its mass, found in the Lower Coal Measures, and technically called *alum ore*. The chief deposits of this mineral in Great Britain occur at Whitby in Yorkshire, and near Glasgow. In preparing A. from the ore, the latter is first roasted—that is, heated in contact with air. By this roasting the iron pyrites is oxidised to sulphate of iron, FeSO_4 , and sulphuric anhydride, SO_3 , which combines with the alumina contained in the ore to form sulphate of aluminum, $\text{Al}_2(\text{SO}_4)_3$. The roasted mass is treated with water to dissolve out the two sulphates, and the solution obtained by this means evaporated to a suitable consistency, and mixed with chloride of potassium. A. and chloride of iron result, the former of which, being less soluble than the latter, is readily separated by crystallisation. A. is a colourless crystalline substance of very astringent acid taste; its solution reddens litmus. It is largely employed by dyers as a *mordant*. See MORDANT and DYEING. It is also used in preparing pigments called *lakes*. A. is used in medicine, and has been employed as an antiseptic. It is sometimes used to adulterate flour intended for making bread, as it appears to give the bread a firm consistency and white colour. *Burnt A.*, or *calcined A.*, is A. from which the water has been driven off by heat. The chemical formula for A. is $\text{Al}_2(\text{SO}_4)_3 \cdot \text{K}_2\text{SO}_4 \cdot 24\text{H}_2\text{O}$. It is, therefore, a double sulphate of aluminum and potassium. There is a large group of compounds having similar properties and composition, and known in chemistry as the *alums*. These contain, in place of the potassium in ordinary A., other metals of the *potassium* group, such as sodium, or lithium, and even ammonium (NH_4), or, in place of the aluminum, another metal of the iron group (to which aluminum belongs), such as iron itself, chromium, &c., or both the potassium and aluminum replaced by metals of their respective groups, thus:—

Ordinary A. $\text{Al}_2(\text{SO}_4)_3 \cdot \text{K}_2\text{SO}_4 \cdot 24\text{H}_2\text{O}$
 Ammonia A. $\text{Al}_2(\text{SO}_4)_3 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 24\text{H}_2\text{O}$
 Iron potash A. $\text{Fe}_2(\text{SO}_4)_3 \cdot \text{K}_2\text{SO}_4 \cdot 24\text{H}_2\text{O}$
 Chrome potash A. $\text{Cr}_2(\text{SO}_4)_3 \cdot \text{K}_2\text{SO}_4 \cdot 24\text{H}_2\text{O}$
 Iron ammonium A. $\text{Fe}_2(\text{SO}_4)_3 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 24\text{H}_2\text{O}$

Alum Bagh ('Garden of the Lady Alum, or Beauty of the Soul'), originally a palace belonging to the royal family of Oude, about 4 miles from Lucknow, converted into a fort by the rebels during the Indian mutiny. It was taken in September 1857 by the English, while advancing on Lucknow, and in November of the same year, when their forces were withdrawn from all the other parts of Oude, it was garrisoned with 3500 men under Sir James Outram. On the 12th January 1858 the A. B. was attacked by 30,000 sepoys, and on the 21st February by 20,000; but the little garrison, cut off from all assistance, maintained a heroic defence till relieved by Sir Colin Campbell in March of the same year.

Alumina is the oxide of aluminum, and is the only compound which oxygen forms with that metal. It occurs largely in nature, and, in combination with silicic acid, is the principal constituent of the different varieties of clay soils and many rocks. In the pure crystallised condition A. is met with as *corundum*; coloured with small quantities of metallic oxides, as the *sapphire*, *ruby*, and *topaz*, and in a less pure state as *emery*; combined with water, as the mineral *diaspore*. A. may be obtained artificially by strongly heating ammonia alum; combined with water, by precipitating a solution of common alum (potash alum) by a solution of ammonia. The A. obtained by either of these methods is, however, amorphous, and not crystalline. Crystallised A. has been obtained by Deville by heating fluoride of aluminum in a charcoal crucible in which is placed a small cupel containing boracic anhydride. The oxygen and fluorine change places, gaseous fluoride of boron and crystallised A. resulting. A. is largely used as a *mordant*; when precipitated on the fibres of cloth, &c., along with a colouring-matter, it adheres closely to both of these, and thus fixes the colour on the fabric. When precipitated in presence of certain colouring-matters, it attaches itself to these, and forms pigments called *lakes*.

A. possesses both *basic* and *acid* properties, it unites with strong acids to form salts of aluminum, and with strong bases (potash and soda) to form compounds called *aluminates*. It is insoluble in water. A. may be fused before the oxyhydrogen blowpipe to a clear glass.

Silicate of A. is the basis of clay soils, most rocks, and many minerals. The *felspars*, which are the most important aluminiferous minerals, contain, in addition to silicate of aluminum, silicate of potassium or sodium. Many rocks, such as granite, gneiss, basalt, porphyry, trap, &c., contain this mineral. By the combined action of air and water on such rocks, they become gradually disintegrated, or *weathered*, as it is called, and crumble down. This change is owing to the felspar which they contain splitting up into soluble salts of potash and insoluble silicate of A. In this manner the different varieties of soil have been formed.

Alum'num, or **Alumin'um**, is a white metal, and one of the 63 elements. Its compounds occurring in nature are numerous and plentiful, and indeed are among the principal constituents of rocks and soils. A. was first isolated by the German chemist Wohler, who obtained it as a grey powder by heating *chloride of A.* with potassium. A. has now become an important article of industry, and is manufactured in large quantities both in this country and in France. It is prepared commercially from a mineral called *bauxite*, from which a double chloride of A. and sodium is first obtained. On strongly heating this double chloride with metallic sodium, and some substance to act as a *flux*—usually the mineral *cryolite*—metallic A. is formed, whilst chloride of sodium (common salt) is produced as a by-product. A. is a white metal, with a slight tinge of blue, and takes a high and lasting polish. This latter property, with the great lightness of the metal (sp. gr. 2.5), renders it valuable for the manufacture of many mathematical and optical instruments, where lightness and durability are essential. A. is highly sonorous—a bar of it, when struck with a hammer, emitting a clear ringing sound. It is malleable and ductile, but becomes somewhat brittle when hammered and rolled. It melts at a temperature between the fusing-points of zinc and silver. It may be used to take castings, as it does not contract much in solidifying. It may be alloyed with most metals, but does not amalgamate with mercury. Its alloys with copper are important. *A. bronze*, largely used in the manufacture of cheap jewellery, &c., is composed of copper and about 9 per cent. of A. A. is not attacked by cold sulphuric or nitric acid, but readily dissolves in hydrochloric acid, and in boiling solutions of caustic potash or soda, evolving hydrogen in doing so.

Its most important compounds are the following:—

Oxide of A. or alumina	Al_2O_3
Double sulphate of potassium and A., or alum	$\text{Al}_2(\text{SO}_4)_3 \cdot \text{K}_2\text{SO}_4 \cdot 24\text{H}_2\text{O}$
Double chloride of A. and sodium	$\text{Al}_2\text{Cl}_6 \cdot 2\text{NaCl}$
Double fluoride of A. and sodium	$\text{Al}_2\text{F}_6 \cdot 6\text{NaF}$

Various silicates of A.

The atomic weight of A. is 27.4; its chemical symbol, **Al**.

Alum Root, the name given in America to the roots of *Geranium maculatum*, which are very astringent. A tincture is prepared from them which is used in cases of ulceration of the throat. A. R. is also applied to the root of *Heuchera americana*, belonging to the Saxifrage family, which is likewise astringent, and is used as a styptic, and as an escharotic in cancer.

Alun'no, Niccolo, an Italian painter, known as Niccolo of Foligno, in which town he settled about 1460. He was the forerunner of the Umbrian school, and produced a large number of pictures, remarkable rather for finish, truth, and exalted sentiment than for great originality. His chief works are 'The Nativity,' in the church of Foligno; 'Piety,' in the cathedral of Assisi; 'The Agony in the Garden,' now in the Louvre; and several pieces at Perugia.

Al'ured, or Alred, of Beverley, an English historian of Henry I.'s time. His *Annals* (*Aluredi Beverlacenensis Annales, sive Historia de Gestis Regum Britannie, Libri IX.*), published at Oxford in 1716 by Hearne, from the only known manuscript, brings British history from the mythical Brutus down to the year 1128. Bale and other critics consider his work in its earlier parts a compilation from Geoffrey of Monmouth's *Deificationes Galfredi*. A. died in 1128 or 1129 at Beverley, where he had been canon of the church of St John.

Al'va, a village of Stirlingshire, Scotland, 3 miles N. of Alloa. It is romantically situated among the Ochil Hills, in a detached part of the county within the confines of Clackmannanshire. Silver was formerly found in a neighbouring glen. The inhabitants are chiefly employed in the manufacture of shawls and tweeds. Pop. (1871) 4096.

Alvara'do, a town of Vera Cruz, Mexico, at the mouth of a river of the same name. It lies near a large lagoon, and is very unhealthy. Vessels over 12 or 13 feet draught cannot enter the harbour for a bar fronting the river. Pop. 6000.

Alvara'do, Pedro de, the chief lieutenant and most trustworthy comrade of Cortez (q. v.) in the wonderful expedition which had for its aim and its result the conquest of Mexico, was born at Badajos towards the end of the 15th c. Engaged in a preliminary expedition on the shores of the Spanish main in 1518, A. in the following year joined Cortez in his project for seizing Mexico, and took a conspicuous part in all the chief incidents of that bold undertaking. His massacre of the Mexican nobles, his conduct of the retreat from Montezuma, and in the final conquest of the imperial city, are among the most striking episodes of this extraordinary chapter of history. He afterwards subjugated several of the maritime provinces in the extreme S. of N. America, was appointed governor of Guatemala by Charles V. in 1533, and headed an adventurous expedition into Quito, which, however, he abandoned on receiving a large sum of money from the conquerors of Peru. He met his death through accident in 1541, while chastising the rebel Indians of Xalisco. A. was one of the most intrepid of that able and unscrupulous band of Spanish adventurers who wrested so much territory, treasure, and power from the dynasties of the New World. See Prescott's *Conquest of Mexico* (1843), and of *Peru* (1847).

Alvarez, Don José, sculptor, born at Priego, Cordova, 23d April 1768. In youth he laboured as a stone-mason, but at an early age he distinguished himself as a modeller in the Academy of Granada, which procured for him the patronage of the Bishop of Cordova. Charles IV. granted him a pension to enable him to prosecute his studies at Paris and Rome. His works were much admired by Napoleon, who commissioned him to design *bassi-relievi* for the Quirinal Palace; and he was the friend both of Canova and Thorwaldsen. He was a member of the Institute of France; of the Academy of St Luke of Rome; and from 1825 principal sculptor to the King of Spain. He was known among his fellow-artists as 'the Greek,' from the vigour and purity of his designs. He died at Madrid, Nov. 26, 1827.

Alveolus, the term applied to the bony sockets or pits in which the teeth of mammals are lodged. Amongst lower vertebrates, the teeth are fastened either by ligament or by bony union to the surface of the bones upon which they are borne; or they may be implanted in ridges, but not in distinct sockets. The crocodiles and alligators form the only animals, in addition to the mammalia, in which the teeth spring from alveoli.

Alwur, the capital of a state of the same name, Rajputana, India, under British administration, 94 miles N.W. of Agra. It is poorly built on a rising-ground 1200 feet above the surrounding country, and 2100 above the sea. Its chief building is the palace of the Rao Rajah. Pop. 3000. The state of A. was bankrupt in 1870, and is now under control of the governor-general, yielding the rajah a revenue of about £180,000. The natives, Mewattis, are a savage race. Area, 3000 sq. miles; pop. (1872) 778,596.

Amade'us ('Love-God'), the name of several members of the house of Savoy, the first of whom of any note was A. V. (1249-1323), who became a prince of the empire. The Savoy in London was built by his brother. His son, A. VI., died in 1383, became viceregent of a large portion of N. Italy. In 1416 Savoy was created into a duchy under A. VIII., who, two years later, was chosen leader of Piedmont, the native dynasty having died out. In 1439 he became Pope as Felix V., but nine years after he resigned this dignity.

Amade'us, Ferdinand Maria, the second son of Victor Emmanuel II. of Italy, was born May 30, 1845. Entering the army with the title of Duke of Aosta, he met with some distinction, and in 1869 he was also appointed a vice-admiral. In 1867 he married Maria, daughter of Prince Charles Emmanuelle dal Pozzo della Cisterna. After the revolution of 1868, Marshal

Palm offered him the Spanish crown, and on the 16th November, 1870 the Cortes finally elected him King Amadeus I. of Spain by a majority of seventy votes. A short and stormy reign, marked by moderation, manliness, and honesty, ended in his abdicating on the 11th February 1873. Although working hard for the good of the country which had made him king, he never succeeded in gaining popular sympathy, and an attempt was even made on his life at Madrid, July 19, 1872.

Amadis, a name common to several heroes of the romantic poetry of the middle ages, the most famous of whom was A. of Gaul, the others being represented as his descendants. Whether the Gaul of the romances meant Wales, or what is now called France, has been keenly debated; but that it was the latter country seems to be well established, for the father of A. was Perion, a mythical king of Gaul, who summons a council of the magnates of his kingdom, and among these we find representatives from Picardy and Champagne. The mother of A. was Elisena, a princess of Bretagne, and he was a love-child, an accident so common in romantic poetry that it carries no stigma with it. From the device on his shield he was known as the Lion Knight, and from his complexion as Beltenebros, the Darkly Beautiful. The chivalric romances were in general tedious, stilted, and unnatural. That of A. of Gaul, on the contrary, displays undoubted genius and a fine creative power, and excels in the delineation of character. It was a favourite with Cervantes, whose inimitable caricature of its weaker successors banished them into merited obscurity. It still has admirers, and has not only furnished materials for the drama of Spain and Portugal, but for modern epics—the *A. de Gaulle* of Creuzé de Lesser (Paris, 1813), and the *A. of Gaul* of William Stewart Rose (Lond. 1803). To those who have no access to the original, nor leisure to read it *in extenso* if they had, the extracts by De Lubert and Count Tressan will furnish an adequate idea of its style and scope.

Different nations have claimed the credit of its origin. Lopez de Vega assigned the authorship to a Portuguese lady; the Comte de Tressan held that it was composed in French in the reign of Philip Augustus; and the Spaniards have at least this credit, that the earliest extant impression is in their language, having been printed at Seville in 1526. But the romance, which in Spanish contains fourteen books, furnishes no internal evidence of a particular nationality. It is in this respect perfectly colourless. The prepossession of evidence, however, tends to fix the composition of it on Vasco de Lobeira, a Portuguese officer, who died in 1403, or, according to Sismondi, in 1325. The first four books were therefore probably written in Portuguese, and, equally with the Homeric poems, convey the impression of having been the growth of an individual mind. The Spanish translation of these was the work of Garcia Ordoñez de Montalvo, who added the fifth book, containing the exploits of Esplandian, the son of A., and an excrescence and dead weight on the original. The remaining nine books contain the exploits and adventures of eleven heroes, mostly Greek, by five independent authors. The French translators, working from Spanish originals, but frequently interpolating matter of their own, have increased the number of books to twenty-four. Translations have also been made into Italian, English, German, and Dutch. The early books narrating specially the exploits of A. were translated by Southey, who has faithfully reproduced the events and manners of the original.

Amadou, the name given to a soft, leathery, cellular substance, obtained from several species of *Polyporus*, a genus of fungi which are found growing on trees. A. is used for tinder, but is principally valued as an excellent styptic in surgery. *P. fomentarius* and *P. igniarius* are the two species from which A. is chiefly derived.

Amalekites, a tribe of Edomite Arabs occupying the district between Palestine and Egypt, and the first to oppose the Israelites after the passage of the Red Sea (Exod. xvii. 7-16). Saul, and afterwards David, nearly exterminated them (1 Sam. xv. 2-9; 1 Sam. xxvii. 8-xxx.); and the 'remnant' was finally extirpated by the Simeonites (1 Chron. iv. 43).

Amalfi, a seaport in the province of Salerno, S. Italy, situated on a steep declivity overlooking the Gulf of Salerno, 24 miles S.E. of Naples. It is the seat of an archbishop, and was formerly a flourishing centre of trade, and had at one time probably more than 50,000 inhabitants. A. claims to have been founded

under Constantine the Great, and was a republic in the middle ages. It took part in the crusades, founded the maritime laws of Italy (*Tabula Amalphitana*), and was the birthplace of Masaniello, and Flavio Gioja, inventor of the compass. It has greatly declined, but still possesses some trade. The valuable MS. of the Pandects (q. v.) was found here. Pop. (1871) 4200.

Amalgamation is often resorted to in extracting gold and silver from their ores, but before this process can be employed the metals must be in the free state. The ore containing the free metals is crushed and agitated with mercury; a fluid amalgam results, containing the gold and silver. This is subjected to pressure in bags of chamois leather, when much of the mercury is forced out through its pores, and an almost solid amalgam, rich in the noble metals, remains. On distilling this, the mercury passes off in vapour, and the gold and silver remain.

Amalgams of gold and silver are also used for gilding and plating articles of metal. The surface of the article is first carefully cleaned, then dipped into the amalgam; a portion of this adheres to it, and on heating the article thus amalgamated the mercury is driven off and the gold or silver remains. An amalgam of tin and mercury is used for silvering mirrors.

Amalgams are produced by fusing mercury (quicksilver) with other metals. From the fact that in many cases heat is given out when such a mixture is made, and that the product frequently crystallises—the crystals having a composition such as can be expressed by a chemical formula—A. are regarded by chemists as true compounds. Sodium, for instance, if dropped into mercury which has been previously heated, unites with it so energetically that sparks are thrown out in all directions, and the resulting amalgam, if it contain sufficient sodium, crystallises on cooling. A crystalline compound of silver and mercury occurs native, and contains the two metals in atomic proportion (108 parts of silver to 200 of mercury); its formula is therefore $\text{Ag}_{108}\text{Hg}_{200}$.

Amalia, Anna, Duchess of Saxe-Weimar, born 24th Oct. 1739, was a daughter of Karl Duke of Brunswick Wolfenbüttel. During the second half of the 18th c. she was the centre and soul of the court of Weimar, which in more than one respect resembled that of Ferrara, where Ariosto and Tasso lived. On the death of her husband, Ernst August Konstantin, whom she lost (1758) two years after her marriage, she devoted herself to the upbringing of her only son, Karl August (q. v.), the noble and true-hearted patron of German literature. Wisely and thriftily she administered the revenues of the state, and always showed herself inspired with a generous zeal for the education and intellectual culture of her subjects. Her love of literature was unfeigned. In 1775 she selected Wieland as tutor for her son, and drew to her court numbers of the most splendid geniuses in Germany, among whom may be mentioned Goethe, Herder, and Schiller. She died 10th April 1807, broken-hearted by the disaster and shame of Jena.

Amande de Terre, or **Earth Almonds**, the French name for the farinaceous tubers of *Cyperus esculentus*. See CYPERUS.

Amanita, a genus of mushroom-shaped fungi. Twelve

species are found in Britain, some of which are edible, while others are highly poisonous. *A. muscaria*, the fly-mushroom, common in birch and beech woods, especially in Scotland, belongs to the latter class, and has derived its vulgar name from a fly-poison having been prepared from it. It is very ornamental, having a brilliant scarlet cap studded over with white or yellowish warts. When partaken of, it produces a peculiar kind of intoxication. The effects are first great cheerfulness, and afterwards giddiness and drunkenness, with an entire loss of consciousness. In Siberia it is much indulged in. Czar Alexis is said to have lost his life by eating it.



Amanita.

Amara nté, a town in the province of Minho, Portugal, on the Tamega, 32 miles N.E. of Oporto. It is in a decaying con-

dition, but has a fine church of the 16th c. in the Flamboyant style. The bridge here was defended by the Portuguese against the French (1809) for several days. Pop. 5500.

Amaranthaceæ and **Amaranthus**, an order and genus of plants. The order embraces 500 species. The genus embraces several showy garden plants. The best known is *A. caudatus*, or love-lies-bleeding, with its drooping inflorescence of crimson flowers. It is the *Queue de Renard* of the French. *A. hypochondriacus* and *A. speciosus* are called prince's feather. Some species of A., such as *A. blitum* and *A. oleraceus*, have been used as pot-herbs. *Celosia cristata*, the cockscomb, and *Gomphrena globosa*, the globe amarantine, belong to the order. The plants are principally mucilaginous and demulcent.



Amaranthus caudatus.

Amarapura ('the city of immortality'), now a city of the past, was the capital of the native state of Burma, situated on the left bank of the Irrawaddy, about 9 miles N.E. of the more ancient capital Ava (q. v.). When the late king came to the throne, orders were given that on a certain day A. was to be deserted, and its inhabitants to remove to a new site, where now stands the city of Mandalay (q. v.), which is now the capital, and which lies 9 miles further up the river, on a plain nearer the foot of the hills. In a temple midway between A. and Mandalay there is a colossal image of Gaudama, carried away by the Burmese when they conquered the kingdom of Arakan, and still guarded by the descendants of Arakanese captives. A. was founded in 1783, destroyed first by fire in 1810, again partly by an earthquake in 1839, and finally deserted in 1852-53. Nothing remains of the old city but a few rows of beautiful trees and some ruined pagodas.

Amara-Sinha, a famous Hindu grammarian and poet, generally supposed to have flourished B.C. 56, though Colebrooke places him as late as the end of the 5th c. In religion he was a Buddhist, and all his writings, except the *Amara-Kosha* ('Treasury of A.'), perished during the fierce persecution of the Buddhists by the Brahmins. This work is often quoted under the name of the *Trikaṇḍa*, i.e., the *Tripartite*, because it is divided into three books. It is a Sanskrit vocabulary, containing about 10,000 words relating to the moral qualities of men, philosophy, the fine arts, the peculiarities of grammar, &c. The substantives are arranged in one or more lines of eighteen syllables each, and form a sort of measure called *vaktra* or *s'loka*. It is a great authority amongst native grammarians. The Sanskrit text was printed at Calcutta in 1831, of which a French translation appeared in 1839.

Amari, Michele, an Italian historian, born at Palermo, 7th July 1806. His love for an English lady induced him to study English, which resulted in 1832 in the publication of a translation of *Marmion*. In 1837 he was transferred from Palermo to Naples, where he prosecuted his studies in history, and in 1842 published his principal work, *La Guerra del Vespro Siciliano* ('The War of the Sicilian Vespers'), translated into German by Schröder, and into English by the Earl of Ellesmere. He then applied himself to the preparation of a history of the Mussulman occupation of Sicily (*Storia dei Musulmani di Sicilia*, Flor. 1853). After the revolution of 1848, he held several important public positions. He thereafter resided in Paris, but returned to Italy, and was made Minister of Foreign Affairs under the dictatorship of Garibaldi (1859), and Minister of Public Instruction in 1863. He is an accomplished scholar in Arabic and modern Greek, and is still (1877) a vigorous student and writer.

Amaryllidaceæ and **Amaryllis**, an order and genus of Monocotyledonous plants, natives of temperate and warm countries. The order embraces 350 species, many of which are ornamental garden plants. The roots of *Hemeranthus toxicarius* and the flowers of the common daffodil (*Narcissus pseudo-narcissus*) are said to be poisonous. The American aloe

(see AGAVE) yields pita flax; its roots are used to adulterate *sarza*, and its juice is fermented to form an intoxicating beverage.



Amaryllis rubra.

The bulbs of the poet's lily (*Narcissus poeticus*) and of the snowdrop (*Galanthus nivalis*) are emetic. The species of *A.* are bulbous-rooted, and very showy plants when in flower. *A. Sarniensis* is the Guernsey lily, and *A. Belladonna* of the Cape of Good Hope is the belladonna lily. These, with *A. vittata*, *A. rubra*, and several other species, are common in cultivation.

Amasi'eh (anc. *Amasia*), the capital of the Turkish vilayet of Sivas, Asia Minor, on the Yesil-Irmak, nearly 80 miles from

its mouth. It stands in a mountain gorge, and is chiefly built of wood. Three bridges span the river, which is made to irrigate the gardens by means of water-wheels. A castle occupies the site of the ancient Acropolis; and the rock-hewn tombs of the kings of Pontus, who had here their residence, are still to be seen. The chief products of the neighbourhood are silk, wine, cotton, corn, tobacco, and madder. Near *A.* are silver, copper, and salt mines. Pop. 25,000. *A.* is the birthplace of Strabo, the geographer, and was long a seat of the Osmanli sultans.

Amasis (the name is a Greek form of the Egyptian *Achmas*, the young moon), a king of Egypt, the successor of Apries, in whom the line of Psammetichus ended, reigned from 569 B.C. till his death, 44 years later. He especially favoured the Greeks, opened the mouths of the Nile to their commerce, took to wife a Greek lady of Cyrene, and formed a body-guard of Greeks. He is said to have been visited by Pythagoras and Solon. His reign was peaceful and prosperous, and he fortunately died before the conquest of Egypt by Cambyes, by whose orders shameful indignities were inflicted on the corpse of *A.*

Amatri'cé, a town in the province of Aquila, Italy, on the Tonto, 80 miles N.W. of Rome. It has greatly declined of late. Pop. 2242.

Amata-tja, or 'the tea of heaven,' the name given by the Japanese to the dried leaves of a species of *Hydrangea*, highly valued by them as tea.

Amaturo'sis is paralysis of vision, or loss of sensibility of the retina to rays of light. It may be caused by changes in the retina itself, or in the optic nerve, or in the brain. Sometimes it appears to be hereditary, but the common causes are increased pressure in the eyeball from excess of fluid, exposure to intense light or heat, the action of the direct rays of the sun, directing the eyes continuously to minute objects, the action of the poisons of fevers, and the action of certain substances, such as belladonna, stramonium, &c. It is usually an incurable condition.

Amazi'chi, a seaport town, the capital of Santa Maura, one of the Ionian Islands, and the residence of a Greek archbishop. Earthquakes are frequent. The harbour, formed by the Anglo-Ionian government, admits only vessels of light draught. Pop. 5500.

Amazon, the greatest of rivers, if length of course or extent of area drained are decisive on that point, and practically forming in itself, through its connection with the Orinoco on the N. and the La Plata on the S., the river-system of S. America, rises in numerous head-waters in Peru—one of these flowing at a distance of only 60 miles from Lima. These head-waters—the Marañon, Huallaga, Ucayali, &c.—flow N.W. through Peru, E.N.E. in a conjoined stream between Peru and Ecuador, forming three-fourths of the boundary between these countries, and first known in this region as the *A.*, and still E.N.E. through Brazil to its mouth in the Atlantic Ocean on the equatorial line, and in long. about 50° W. It is 4000 miles in length, drains 2,330,000 square miles of basin, has an inland

navigation of 50,000 miles, is 150 miles wide at its mouth, and delivers a volume of water so vast as to overlie the ocean to the distance of 50 leagues from shore. From the N. its chief tributaries are the Napo, Putumayo, Yapura, and Rio Negro, by which it is in communication with the Orinoco; and from the S. the Yavary, Madeira, Tapajos, and Xingu. The *A.* was first navigated by steamers in 1853, since which time vessels of 1000 tons pass up the river from its mouth in the Atlantic to the towns of Peru. Expensive hydraulic works and canals of communication would be required, however, to develop its navigation, and the translator of Marco's *Journey across South America* says that it is not conceivable that, from the physical impediments to its navigation, &c., this river should ever play the part in civilisation of the Nile or the Mississippi, and that 'after all, it must be a question whether the free navigation of the River Plate is not of more immediate commercial importance than the opening up of the *A.*' See *A Journey across South America from the Pacific Ocean to the Atlantic Ocean*, by Paul Marcoy (Blackie & Son, 1873).

Amazons (the etymology of the name is disputed, some connecting it with the Greek *a* privative, and *maios*, the breast, and others with the Circassian *maza*, the moon), a nation of female warriors, prominent in the adventures of Greek mythology, but probably in some sense a historical race, whose principal seat was on the Thermodon, near Trapezus, the modern Trebizond. They are said to have been governed by a queen, and once a year they met with the Gargareans in the mountains to propagate their race. The legend says that the offspring, if male, was sent back to the Gargareans or put to death, while the females were brought up, their right breasts being cut off, to facilitate their handling the bow in war and in the chase. Ephesus, Smyrna, Cyrene, Mytilene, and Paphos were supposed to have been founded by the *A.* The ninth labour of Hercules was to take from the Amazonian queen Hippolyte, the girdle she had received from Mars. Another queen, Penthesilea, who brought a body of *A.* to the assistance of Priam towards the close of the Trojan war, was slain by Achilles, and (according to Plutarch) they even figure as late as the time of Alexander the Great, when their queen Thalestris paid the great conqueror a visit. Scythian and African *A.* are also mentioned. The Greek imagination was much struck with the legend of the *A.* and some of their most admired paintings on vases, &c., have for their subjects the battles of the *A.* with men. See Mordtmann, *The Amazonen* (Hanover, 1857).

Ambassador, an officer sent by one state to another with authority to transact business. By the law of nations an *A.* has many important privileges. Neither he, his household, nor suite are amenable to the laws of the country to which he is sent, but are held amenable to the law of the country in which they are resident. The exact limit of the privilege is not however clearly defined. In the reign of Anne, the *A.* of Peter the Great was arrested in his carriage in London for a debt of £50. Peter and the foreign ministers generally, demanded summary punishment of the offenders. The British Constitution did not, of course, permit of punishment without trial and conviction, but an Act of Parliament was passed to prevent the repetition of this offence to foreign nations. An *A.* loses his privilege if he commit an offence against the state to which he is resident; and for plotting against the life of its sovereign he may even be executed.

Besides the ordinary *A.*, Ambassadors Extraordinary are on special occasions accredited by one state to another. Inferior diplomatic agents are employed by Great Britain at the minor courts of Europe. These are called Chargé d'Affaires, Envoy, or Minister Plenipotentiary (q. v.).

Amato, a flourishing town in the province of Leon, Ecuador, S. America, near the N.E. base of Chimborazo. It stands 8859 feet above the sea, on a tableland which produces much grain, sugar, and cochineal. *A.* was totally destroyed in 1698 by an eruption of Cotopaxi, but has long since been restored. Pop. 10,000.

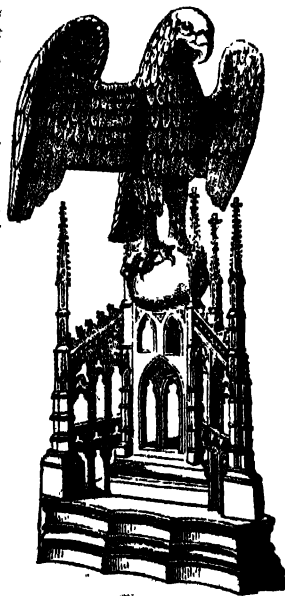
Amber is an exudation, altered by fossilization, of many species of extinct conifers, and resembles some gum-resins in its appearance and properties. It is hard and brittle, has a resinous lustre, and varies in colour between a pale straw and a reddish orange or brown, being usually transparent, but often clouded and opaque. Its ultimate composition is carbon 78.94, hydrogen 10.53, and oxygen 10.53. By friction it becomes negatively

electrical; hence our word electricity, through its Greek name *electron*. Personal ornaments of A. were highly esteemed among the Greeks and Romans, and are still much valued in Mohammedan countries. A. is found in many parts of the globe, especially on the Prussian coast, between Königsberg and Memel, where it is dredged and dived for in the surf, and obtained by mining operations in the sandhills of the interior. The annual value from all sources in this locality averages £60,000. Manufactured A. consists chiefly of pipe-mouthpieces, beads, amulets, and other personal adornments, and is mostly disposed of through Eastern channels. The trade in raw and manufactured A. is annually increasing. The lemon opaque variety is commercially most highly esteemed.

Amber, an ancient city of Jeypoor, India, now almost deserted. It lies among high hills, on the shore of a small lake, and its temples, tombs, and ruined houses are haunted by Hindu fanatics. The palace of A. is a splendid building.

Amberg, a walled city, formerly the capital of the Oberpfalz (Upper Palatinate), Bavaria, lies on both banks of the Vils, 35 miles E. of Nürnberg, and 32 N.W. of Ratisbon. It is handsomely built, and possesses, besides several fine churches, an agricultural school, a lyceum, a library of 32,000 volumes, a museum, and an arsenal. The chief products of A. are firearms, earthenware, beer, woollens, and ironmongery. There are extensive mines in the vicinity. Pop. (1875) 13,382. Near A. the French, under Marshal Jourdan, were beaten by the Archduke Charles, 24th August 1796.

Ambergris, a solid fatty substance, of a speckled grey colour, and a specific gravity from .780 to .896, which owes its name to a fancied resemblance to raw amber (*ambre-gris*, grey amber). Its origin was long unknown, but it is now pretty clearly ascertained to be a morbid secretion, probably of the gall-ducts, of the sperm whale, *Physeter macrocephalus*, in whose intestines pieces have been discovered. It is found floating on the sea, and is frequently thrown upon the shores of Greenland, China, Japan, W. Indies, Brazil, and other tropical countries, and rarely on the W. coast of Ireland. A. possesses a peculiar, sweet, earthy odour, and is employed in perfumery in the form of powder or alcoholic solution, to mix with other perfumes, whose fragrance it is said to increase. At all times a costly product, its market value fluctuates much with the supply, and is seldom less than 20s. an ounce.



Ambo.

Amblyopia, dimness of vision, caused by a defect in the accommodative arrangements in the eye for bringing a clear image on the retina at different distances. See EYE.

Am'bo, a kind of large pulpit, with a double ascent (whence the name), from which, in the ancient Church, the Gospels and Epistles were read, and sermons occasionally preached. It usually stood at the end of the choir. The Eastern churches and the basilica churches of Rome still furnish specimens of the A. In England the rood-loft served the same purpose. The A. had many other names, as the bema, lectorium, pulpitum, analogium, tribuna, &c.

Am'boise (anc. *Ambacia*), a town in the department of Indre-et-Loire, France, lies on the left bank of the Loire, 15 miles E. of Tours by rail-

way. It is situated in a rich wine district known as 'the Garden of France', and possesses an old Gothic castle, restored by Louis Philippe, in which have resided several kings of France. The

Arab chief Abd-el-Kader lived at this castle when a captive in France. The religious wars of the 16th c. began in A., where also the Calvinists were first called 'Huguenots.' Pop. (1872) 4098.

Amboise, George d', cardinal, born at Chaumont-sur-Loire in 1460, became Bishop of Montauban in 1474, when only fourteen years of age; Archbishop of Rouen in 1493, and Prime Minister of Louis XII. in 1498. Thenceforth he is the chief political force in France, and was the real author of the French policy in Italy. He made an unsuccessful attempt to mount the papal throne on the death of Pope Alexander VI., and became in consequence the bitter enemy of the next two popes, Pius III. and Julius II. His experience as a statesman was great. Loyal to his king, devoted to his country, and faithful to his order, he managed to successfully combine the duties of a Churchman with those of a politician. He died at Lyon, 25th May 1510. A biography of A. by Montagne was published at Paris in 1631, and another by Legendre at Rouen in 1724. To understand A. rightly, one must read his *Lettres au Roi Louis XII.*, published at Brussels (1712). See also Barrière de Vieuzac's *Éloge de G. d'Amboise* (1806).

Amboyna, one of the chief of the Moluccas or Spice Islands, in the Malayan archipelago, lies about 2 miles S.W. of Ceram, and is the seat of the Dutch government, to which the entire group belongs. It is nearly 32 miles long and 10 broad, and is of irregular shape. Area, 287 sq. miles; pop. 30,000. It is mountainous, well watered, and fertile, but is liable to be deluged by the heavy rains which accompany the E. monsoon. The climate is healthy, and the chief productions are cloves, sago, pepper, sweet potatoes, coffee, cocoa-nuts, and indigo. Fine timber for cabinet-work is plentiful, but clove cultivation is the principal industry. In the 17th c. the Dutch took A. from the Portuguese. Its native population speaks a Malay dialect, but is probably of Hindu origin. The capital, A., lies on a peninsula which forms the eastern side of the bay of A., and has an excellent harbour. It has been a free port since 1854, and contains two Protestant churches, an hospital and theatre, and is guarded by Fort Victoria. There is a training-school for native teachers and ministers under the care of the Netherlands Missionary Society. Pop. 9000.

Amboyna Wood, a beautifully-mottled reddish wood, obtained from *Pterispermum indicum* in the form of excrescences or wens on the stem, used principally for inlaying.

Am'brose, St., one of the great fathers of the Western Church, was born in 340 A.D., at Trèves. His father was a prefect in Southern Gaul. His mother, ardently devoted to the Christian religion, exercised a profound influence on the development of his character. A., however, was not originally intended for the Church, but for the administration of the Roman law, and the sudden revolution in his career displays a romantic singularity of circumstance. Appointed by the Emperor Valentinian governor of Northern Italy, he so won the affections of the people by the evangelical benignity of his rule, that when the Archbishop of Milan died in 374, the Christian populace, almost equally divided in their sympathies between the Arian and Athanasian forms of the new religion, could find no happier solution of their difficulties than to elect the young magistrate, whose piety and humanity had endeared him alike to both parties. It was in vain that A. protested, declared himself unworthy, and tried to engender aversion by affected severities as a judge. It was in vain that he even brought harlots to his house, in the hope that such an outrage upon decency would enable him to escape this unwelcome honour. The people cried out with mad enthusiasm, 'We take thy sin upon our heads.' At last he had to yield, was baptized, and eight days after, though merely a catechumen, was consecrated to the see of Milan.

Though the choice both of Arians and Athanasians, A. did not hesitate for a moment in regard to the creed he should adopt. By the strength and tenderness of his imagination, by the humility and ardour of his faith, he was irresistibly drawn towards the sublime dogma of the Trinity. He was not a great thinker—subtle speculations had no charm for him—but he had a strong sense of the mystery of the Godhead, and drew a practical inspiration from the sentiment of reverence which this mystery awoke in his soul. The power of A. lay in his life and work, not in his writings. All through his career we recognise the devout Chris-

tian and the heroic Churchman. No man was more trusted in the Roman empire. From the borders of Mauretania to the confines of Thrace, men came to seek his help and protection. In the confusions that followed the death of Valentinian I., he saved Italy from the horrors of war by the personal influence he exercised upon the rebel general Maximus. When the dearth that afflicted Italy in 383 tempted the Roman senate, in which the elements of Paganism were still to be found, to demand a recognition of the ancient religion, the impassioned eloquence of A. frustrated the policy of cowardice and fear. The enmity of the Empress Justina, widow of Valentinian, who leaned to the Arian party, occasioned the fiercest tumults in Milan. The life of the archbishop was in the greatest danger; but his courage saved him from martyrdom, and the imperial court finally quailed before the opposition of the invincible priest. When Theodosius appeared in Italy in answer to the appeals of A., and destroyed the party of Maximus, he had still to learn that there was one man in the empire mightier than himself. The massacre of the Thessalonians was a crime for which neither senate, nor magistrate, nor philosopher dared to upbraid him; but when he presented himself for admission to the communion-table at the church of Milan, A. sternly ordered him to withdraw until he had made public confession of his sin. The emperor felt himself constrained to obey. The return of Theodosius soon after to the East again left Italy a prey to political and social disorder; and a Frankish chief, Arbogastus, for a moment made himself master of the peninsula. He and a certain Eugenius, a rhetorician, to whom he contemptuously assigned the imperial authority, did all they could to resuscitate Paganism; but their triumph was short-lived. Theodosius swiftly returned, and annihilated their army near Aquila. Paganism was now finally proscribed. Some say, though the best criticism is against the belief, that it was in honour of this great victory that A. composed the famous *Te Deum* still sung in almost all the churches of Christendom. He died at Milan in 397, not long after Theodosius, to whom he was deeply attached, and who in turn loved A. for his courage and fidelity. The best edition of A.'s writings, which are chiefly expositions of Scripture, with treatises, from a religious point of view, on Virginity, Widowhood, the Sacraments, Penitence, &c., is that of the Benedictines (Paris, 2 vols. 1686-90).

A. is also known to us in connection with church music, which he was the first to place upon anything like a popular basis. He adopted some of the simpler parts of the Greek musical system, and used only the four of their 'diatonic modes' (since called Ambrosian modes) which correspond to the scales beginning upon D, E, F, and G upon the pianoforte, using the white notes only.

Ambrosia, in Greek and Roman mythology, was the name given to the food of the gods, and was supposed to have the power of conferring immortality on all who ate of it. Hence probably its name, which is compounded of *a*, privative, and *bratos*, mortal. The *m* is, however, part of the root, and is seen in the form *mortos*. Comp. Lat. *mors*, death, and *mori*, to die; Sans. *mri*, to die. The Sanskrit *a-mrita*, or elixir of immortality, expresses the same idea. A. was represented as sweeter than honey, and of a most fragrant odour.

Ambrosian Chant, choral music introduced by St Ambrose, Bishop of Milan, into the Western Church in the 4th c., but superseded in the 6th c. by the Gregorian Chant. It was sung antiphonally. The A. C. is still occasionally sung in the Cathedral of Milan.

Ambrosian Library, Milan, founded by Cardinal Archbishop F. Borromeo in 1602, opened in 1609, and named after St Ambrose (q. v.). The printed books number 87,000 vols., and the MSS. 15,000. Two *Doctores Bibliothecæ Ambrosianæ* make the treasures of the library accessible to visitors. The Palimpsests, and Petrarch's copy of 'Virgil,' containing an autograph account of his first meeting with Laura, are among its greatest rarities.

Ambry, or **Aumbry**, a recess in the wall of a church, or a wooden cupboard near the altar, for keeping the sacred vessels, oils, books, &c., and used in the service of the mass. In Scotland the word is still used to denote any recess containing the necessaries of housekeeping. It is probably a corruption of almonry (Old Eng. *almerie*), and must originally, therefore, have been applied to a place where alms were kept for distribution.

Ambulacral System (Lat. *ambulare*, to walk), the name given to a peculiar system of vessels or tubes ramifying within the bodies of Echinozoal animals (star-fishes, sea-urchins, &c.),

by means of which water is admitted to the interior of the body, and through dilating the tubular feet, is made subservient to the locomotion or movements of the animals.

Ambulance (a French word, from the Latin *ambulare*, to walk or march) is a name applied to a movable field hospital,

in which wounded or sick soldiers are carried from the scene of conflict. The first A. train was organised by Baron Percy, a celebrated French surgeon under the First Napoleon. Somewhat later, Baron Larrey introduced great improvements in this important department, and his methods have been adopted in various European armies. At the Crimea, the British A. corps was very inefficient, notwithstanding the recent improvements of Drs Guthrie and Smith, who devised a cart and waggon respectively. During this war the French used what they called *cacolets*, each consisting of two stretchers, hung one on each side of a mule's or pony's pack-saddle. These, which in many circumstances were far more convenient than waggons, were latterly adopted by the English.



Ambulance Cart.

Ambulance Corps, now included in the Army Hospital Corps, was organised by the War authorities during the Crimean war, and consisted of a body of men set apart for ambulance duties. Towards the close of the war, however, it was superseded by the Land Transport Corps (q. v.)

Ambuscade, or **Ambush** (the former derived from the Italian *imboscata*, concealed in a wood), means the lying in wait of a party for the purpose of attacking an enemy unaware of its presence, and, before the introduction of firearms, was a very frequent manœuvre.

Amelan'chier, the Sardinian name for the medlar, and applied by botanists to a genus of plants belonging to the order *Rosaceæ*. The common A. (*A. vulgaris*) is a small tree cultivated in Britain. *A. botryapium* is the American grape-pear or June-berry. The fruit of several species is edible.

Amelia (anc. *Ameria*), a town of Umbria, Central Italy, lies picturesquely about 7 miles N. from the confluence of the Nera (anc. *Nar*) and Tiber. It is one of the oldest towns of Italy, and the remains of its ancient walls prove it to have been a place of strength, but its name is not mentioned in history before the time of Cicero. A. is a bishop's see. Pop. (1871) 7207.

A'men, Hebrew, 'firm, faithful;' but also an adverb equivalent to 'yea,' 'verily,' 'so let it be,' and used both by Jews and Christians in their forms of worship. The early Christians responded A. at the close of the prayer offered by the presbyter. The early practice of *shouting* A. at the celebration of the Lord's Supper by each recipient of the elements gave so much scandal, that it was discontinued after the 6th c. A. was pronounced in the Greek Church after the name of each person of the Trinity.

Amend'ment, a judicial and parliamentary term. As the former, it denotes a method of correcting errors in civil and criminal actions, which has lately been much improved in England and in Scotland.

In Parliament, an A. is an alteration proposed in the draft of any bill, or in the terms of any motion. No member, except when the House is in committee, is allowed to speak more than once on the same question; but he may speak again on an A. The original motion, if seconded, is always put first from the chair, thus: 'That the words proposed to be left out stand part of the question;' if this be carried, the main question is next put, and of course agreed to. But if the question as above be negatived, the motion is put with the omission of the words which it refers to, so that the A. separately is not voted upon.

Amenorrhœa is the absence of the monthly menstrual discharge from females. There are two kinds: (1) that in which the menses have never appeared; and (2) that in which the

meneses, after continuing for some time, have ceased. The first class of cases are due to congenital malformation, or to the habits of the individual, or to errors in the digestive process. Luxurious and indolent women are specially prone to this affection. In some of these cases there may be a vicarious discharge of blood from another organ, such as the lungs, or bowels, or skin. The second class of cases may be caused by cold caught during menstruation, wetting of the feet, bodily or mental shock, mental depression, fever, or severe bodily injury. The treatment varies according to the cause. If due to congenital defects, nothing can be done. If it be the effect of debility, tonics, more especially those containing iron, are useful. If the menstrual discharge has been suddenly arrested, warm hip or foot baths often do good. Frequently, in cases of A., purgatives containing aloes are serviceable. It is an affection requiring medical advice.

Amentia, a variety of insanity identical with the conditions termed dementia and idiocy. It is characterised negatively by the absence of all intelligence, emotions, or will. See **INSANITY**.

Amentiferae, a large and important natural order of Dicotyledonous trees and shrubs, which have unisexual flowers, and bear the male flowers in catkins or *amenta*. The order has been divided into the following sub-orders: 1. *Salicinae*, the willow and poplar tribe, natives of temperate and cold regions; 2. *Myricae*, the sweet gale and candleberry myrtle tribe, natives both of temperate and tropical countries; 3. *Casuarinae*, the beef-wood tribe, found in Australia; 4. *Betulinae*, the birch and alder tribe, natives of temperate regions; 5. *Balsamiferae*, the liquid amber tribe, balsamic trees found in warm and tropical countries; 6. *Platanæ*, the plane-tree tribe, natives chiefly of temperate regions; 7. *Cupuliferae*, the oak, hazel, and beech tribe, natives both of temperate and warm countries. Authors frequently treat these sub-orders as separate orders.

America, next to Asia, the largest of the four continental divisions of the world. Alone of these continents it stretches throughout four zones, and its shores are washed by the Northern, the Atlantic, the Southern, and the Pacific Oceans. Its extreme length cannot be accurately fixed, but from Cape Barrow in the N. to Cape Horn in the S. it is fully 9000 miles, or 130° of latitude, and its greatest breadth, from Cape St Roque in Brazil to Cape Parma in Peru, is 3250 miles, or 46° of longitude. Including the islands, the total area is estimated at 15,783,372 sq. miles, and the population at 84,312,087. Perhaps the most remarkable characteristic in the physical aspect of A. is its immensity; nature is here seen, whether in mountain, river, cataract, lake, or forest, on the grandest scale. This vast territory consists strictly of two peninsulas and an isthmus, which are named respectively North, Central, and South A. After recounting the history of A.'s discovery and colonisation, the subject will be considered separately under these three heads.

The *discovery* of A., as commonly understood, means its discovery by Columbus. It must not be forgotten, however, that the primitive races are possibly to be regarded as immigrants, and at any rate that, long before the time of Columbus, Europeans had certainly found their way hither. As early as 1000 A.D. the Scandinavians, having previously colonised Iceland and Greenland, penetrated as far S. as the State of Massachusetts, and in 1170 a Welsh prince, Madoc, is said to have landed on the coast of Virginia. But these visits (and that of Madoc is more than doubtful) neither led to permanent settlements nor to a widespread knowledge of the existence of a continent in the W. Toward the end of the 15th c., however, the great commercial importance of a sea-passage to the E. Indies beginning to be keenly felt in Europe, gave rise to an ardent spirit of discovery, and Columbus (q. v.), perhaps the most intrepid and enterprising of discoverers, announced his grand scheme of reaching India by a westward route, thereby showing indisputably his belief in the rotundity of the earth. Under the patronage of Ferdinand and Isabella of Spain, he set sail on Friday, 3d August 1492, and on the 12th of October following landed on one of the Bahamas, probably Watling's Island, which he named San Salvador. This was followed in due course by the discovery of Cuba, Hayti or Hispaniola, Jamaica, and others of the Antilles; and these islands, being regarded as part of India, received the appellation of W. Indies, a name by which they soon became permanently known. Columbus, on three subsequent visits, also explored the coast of Central A. southward from Honduras, and that of South A. from

Margarita to the mouths of the Orinoco. The success of the great discoverer soon attracted in his wake a host of enterprising adventurers, among the first of these being Alonzo de Hojeda, one of whose officers, Amerigo Vespucci (q. v.), has had the honour accidentally assigned him of giving name to A. For many years the exploration of the New World was briskly pursued, other European nations besides Spain freely taking part in the glorious work of discovery. In 1498, Sebastian Cabot, a Venetian in the service of England, visited Newfoundland; in 1500 the Portuguese Gaspar Cortereal touched at Labrador, and sailed along the coast nearly to Hudson's Bay; and in 1513 Vasco Nuñez de Balbao crossed the Isthmus of Panama and beheld the Pacific or Southern Ocean. In South A., again, the Spanish navigator Pinzon (1500-14) explored the coast to 40° S. lat.; a Portuguese fleet under Cabral in 1500 accidentally discovered Brazil a few months later than Pinzon; Solis entered the La Plata in 1515, where he was slain by the natives; and Magellan discovered the strait bearing his name in 1519, and for the first time circumnavigated the globe. The route round Cape Horn was only discovered in 1610 by Schouten, a Dutch navigator, and it was not till 1851 that Maclure's expedition proved the existence of a N.W. passage. On the discovery of A. it was found to be inhabited by a vast number of peoples, differing in character, physical appearance, and language. Some of these races had reached an advanced stage of civilisation, as is sufficiently attested by the architectural remains scattered over Mexico, Peru, and the Mississippi Valley, but none possessed a written language, and all history was therefore veiled in the obscurity of tradition. See **AZTECS**, and **INDIANS**, **AMERICAN**.

The work of *colonisation* was begun by Spain with vigour and enterprise, but in a spirit of tyranny and aggression. Little or no resistance could be made by the inhabitants against armed bodies of Europeans, and at every point of contact they were either massacred or forced to retire. With 600 men Cortez (q. v.) conquered Mexico, and Pizarro (q. v.), with even a smaller force, destroyed the empire of Peru; and here, in the two most populous countries of A., the number of inhabitants sensibly diminished at the approach of the invader. The almost entire depopulation of natives in the Antilles creating, as it did, a universal demand for field labourers, was the immediate cause which led to the establishment of the African slave trade. The Portuguese meantime were pursuing a somewhat similar policy on a portion of the basins of the Amazon and the Parana to which they gave the name of Brazil. For some time the Portuguese and Spanish were the sole European colonists, the empire of the latter embracing one-half of both Americas. The first French colonies were those of Canada (q. v.) in 1608, and the earliest English settlement was that of Virginia in 1607. See **UNITED STATES**. The whole of A. is now under European rule, with the exception of the aboriginal state of Araucania, included in Chili, and the African republic of Hayti, the oldest of the Spanish colonies.

NORTH AMERICA extends from the Gulf of Mexico, in nearly 30° N. lat., to the Arctic Ocean, having a length of about 4000 miles, and an extreme breadth of 3100 miles. Its shape, when we exclude Mexico, is almost square, but in the S.E. the peninsula of Florida projects from the mainland, and in the N.W. the regular outline is broken by the territory of Alaska. The western coast is little indented, the only marked irregularity being the long narrow peninsula of Old California. The eastern coastline, however, consists of an almost continuous series of bays, gulfs, and inlets, which become larger and more frequent toward the N., where Davis' Strait and Baffin's Bay separate the mainland from Greenland, and Hudson's Strait leads to the immense bay of the same name occupying the centre of British A. North A. is remarkable for its two great mountain ranges, its chain of immense lakes, its extensive river systems, and its vast plateaux and low plains.

The two *mountain systems* of North A. are the Rocky Mountains and the Alleghanies or Appalachians, both of which are described in separate articles. The Rocky Mountains extend, in a triple chain, from the plateau of Mexico to the Arctic Sea, a length of about 4600 miles. The main or easterly range forms the boundary of the Mississippi Valley, and is in many parts volcanic. The range that stretches into the Californian peninsula forms the coast-line as far N. as Vancouver's Island, and at some distance from the coast-range runs an intermediate chain, interrupted by occasional gaps. Near the 40th parallel of N. latitude

the Rocky Mountains are crossed by a transverse chain, which at each point of intersection towers into a height of 10,000 feet. On either side of these snowy mountains lie the great gold-fields of California and Oregon, formed chiefly of the gravels descending from the mountain-sides. There are no recent volcanic cones S. of Oregon, but northward the mountains are frequently volcanic. The coast-range terminates in the N. in a peak called St Elias, nearly 18,000 feet high, and in the neighbourhood of Mount Fairweather some 16,000 feet high. The Alleghanies are also a triple chain, but of much lower altitude, running nearly parallel with the E. coast almost from Maine to Alabama. They are intersected at various places by the passage of the rivers, and have a mean altitude of 2500 feet.

The chief river systems are the Mississippi, the St Lawrence, and the Mackenzie. The first of these, the great 'Father of Waters,' collecting the streams of the Missouri, the Ohio, the Arkansas, and the Red River, has a drainage area of some 1,250,000 sq. miles, and a total length of about 4000 miles. Next to the Amazon, it is the largest stream in the world, and, extending for most part in temperate latitudes, it far excels the larger river in its commercial importance, affording unrivalled facilities for internal communication. Together with its numerous tributaries, it drains the great central plains of A. as far N. as the low plateau which stretches across the country near the Canadian lakes, forming the watershed between the streams flowing to the Arctic Ocean and those entering the Atlantic or the Gulf of Mexico. Beyond this same dividing range the chief river is the Mackenzie, which has a course of 1770 miles, and flows into the Arctic Ocean. The drainage of this part of the country to the N. and W. is completed by many little-known but important rivers, all of which enter Hudson's Bay, after flowing through numerous large lakes on their course. The third great river system is the St Lawrence, with its chain of immense lakes. It flows E. and enters the Atlantic after a course of about 2000 miles, having a drainage area estimated at 400,000 sq. miles. The Atlantic slope is drained by numberless rivers that take their rise in the Alleghanies, and which, though small in comparison with the Mississippi or the St Lawrence, are invaluable for industrial or navigable purposes. The only important rivers that empty themselves into the Pacific are the Colorado, the Sacramento, the Oregon, and the Fraser, all of which rise in the great western plateau.

The lakes of North A. are larger and more numerous than those of any other country in the world. The principal are the five great lakes linked together by the St. Lawrence, and these have a total area of 120,000 square miles, which alone is almost half the aggregate fresh-water surface of the globe. Lake Superior is the largest of these, having an area of 31,400 square miles, and a mean depth of about 1000 feet. It is 627 feet above the Atlantic, and 355 miles in length. The longest of the lakes, however, is Michigan, which has an area of 25,600 square miles, and a mean depth of 1000 feet, being 578 feet above the Atlantic. Lake Huron has an area of 23,800 square miles, and a depth of 1000 feet. Erie and Ontario are far inferior both in depth and dimension. A chain of great lakes also runs through British North A. in a N.W. direction, from the neighbourhood of Lake Superior to the lower reaches of the Mackenzie river, of which the most notable are Winnipeg, Winnipegosis, Deer Lake, Wollaston, Athabasca, Great Slave Lake, and Great Bear Lake. The western plateau contains Great Salt Lake.

The plateaux and low plains are as distinctive a feature in the physical geography of North A. as its great lakes or river systems. The great central plain stretches from the Gulf of Mexico to the Arctic Ocean, is watered by all the principal rivers, and has an area of over 4,000,000 sq. miles. This vast expanse is only interrupted by the plateau near the Canadian lakes, towards which the land slopes gradually from N. and S., and the elevation ranges from 700 to 1500 feet. It is extremely fertile, even in the Canadian portion, where the climate is most rigorous. In the S. the plains have the advantage of a sub-tropical climate, and are widely cultivated and richly productive. Here, also, occur the savannahs or prairies of the Mississippi, partly alluvial, and partly heathy pine-barrens. To the E., again, a wide belt of rich plains extends between the Alleghanies and the Atlantic coast-line.

The islands which may be considered as belonging to North A. are extremely numerous, and will be described under their

respective heads. The most important are—(1) the W. Indian Islands, embracing the Greater and Lesser Antilles and the Bahamas, stretching in a great curve from the coast of Venezuela towards the peninsula of Florida, and forming a dividing line between the Atlantic Ocean proper and the Gulf of Mexico and Caribbean Sea; (2) the Bermudas, about 600 miles off the coast of Carolina; (3) the islands at the mouth of the St Lawrence, namely, Newfoundland, Prince Edward Island, Cape Breton, and Anticosti; (4) Cumberland, Cockburn, Southampton, and Melville Islands; Prince Albert Land, Banks' Land, and many others of the vast Arctic archipelago. Greenland is also generally regarded as a westerly member of the latter group. The only large islands on the W. coast are the Aleutians, forming an archipelago in themselves, Queen Charlotte and Vancouver's Islands.

The zoology is varied and peculiar, and among the more notable species may be mentioned the polar, black, and grisly bears, the moose, red, Virginian, and other deer, the puma, lynx, glutton, wolf, American fox, badger, otter, racoon, opossum, beaver, ermine, bison, and prairie dog. Of birds, the white-headed and other eagles, vultures, mocking and humming birds, passenger-pigeons, &c. The alligator, tortoise, rattlesnake, black snake, and siren are prominent among the reptiles. The domestic animals of Europe have been introduced successfully, and there is abundance of all kinds of fish.

The geology of North A. has been much more fully investigated than that of the southern half of the continent, for the obvious reason that in the northern part the extension of civilisation and scientific influences has proceeded at a much greater rate than in South A. The Laurentian rocks attain a large development along the line of the St Lawrence river, from which they derive their name. These rocks, once sedimentary, are now crystalline and metamorphosed, and they contain the famous *Eozoön Canadense*, or 'dawn of life animalcule.' The Cambrian rocks of A. lie unconformably on the Laurentian gneiss, and are termed Huronian beds by Sir W. Logan. These are sandstones, corresponding to the British Cambrian beds, and contain no fossils. The Lower Silurian rocks of North A. spread over Canada and the United States. These formations contain numerous fossils of *Graptolites*, *Brachiopoda*, *Cephalopoda*, &c. The Upper Silurian rocks are well developed. In the Mississippi a Carboniferous series lies directly on the Silurian. The Carboniferous system in North A. is also well developed. The Jurassic or Oolitic rocks are represented, according to Sir C. Lyell, by sands and clays, with beds of coal and numerous plant fossils. Professor W. B. Rogers says the Richmond-Virginian coal-field, of great value, belongs to the Oolitic period. The Cretaceous or chalk rocks are represented in New Jersey by sandy and clay beds, containing chalk fossils. Dr Hector says that sandstones, clays, and shales occupy the centre of Canada, E. of the Rocky Mountains. The evidences of the Glacial Period or Ice Age are best seen in North A., where a southward movement of polar ice must have taken place. Glacial deposits occur as far S. as lat. 39°.

The political divisions, areas, and populations of North A., are as follows:—

Governments.	Area in Square Miles.	Population.	Capitals.
United States (1880)	3,603,884	50,758,866	Washington.
Danish America (Greenland)	34,038	9,825	Lichtenfels.
French Possessions . . .	82	4,750	St Pierre.
British North America—			
1. The Dominion of Canada—			
Canada East, or Quebec	293,355	1,191,516	Quebec.
Canada West, or Ontario	107,780	1,620,851	Toronto.
Nova Scotia . . .	21,731	387,800	Halifax.
New Brunswick . . .	27,322	285,394	Fredericton.
Manitoba . . .	13,993	11,963	Fort Garry.
British Columbia . . .	213,000	42,000	{ New West- minster.
Hudson's Bay Terri- tory, or Rupert's Land }	9,934,040	85,000	York Factory.
Prince Edward Island . .	2,173	94,021	Charlotte Town.
2. Newfoundland . . .	40,200	146,536	St John's.
3. Bermudas . . .	84	15,309	Hamilton.
Total . . .	7,791,545	54,048,001	

CENTRAL AMERICA, in which we include Mexico, forms the connecting-link between the two greater divisions of the continent. It is 2500 miles long, and has in the N. an extreme

breadth of 750 miles, but gradually narrows towards the isthmus of Panama, where it is only 40 miles across. The coast-line to the W. is almost unbroken, but that on the E. contains many small bays, and is of a somewhat zigzag shape. The great tableland of Mexico, along with the volcanic mountain chain of Guatemala, connects the Rocky Mountains with the Andes. In Central A., besides mountain chains and tablelands, there is a considerable river system, but few great lakes.

The tableland of by far the greatest magnitude is that of Mexico, which begins at the narrow isthmus of Tehuantepec and stretches into North A., having a breadth at the city of Mexico of some 400 miles, and an elevation of 7500 feet above the sea. On all sides it rises abruptly, and its summit is portioned off into four separate plains by an irregular range of hills about 1000 feet high. The city of Mexico is built on one of these hills, at a point where a line of active volcanoes extends across the country. The tableland of Guatemala, continued from Tehuantepec to the isthmus of Panama, is the next in importance, and is of volcanic formation. The climate of these tablelands is extremely healthy, though that of the coast is humid and malarious.

The great mountain chains are the Sierra Potosi, the most easterly range; the Sierra Sonora, towards the W. coast; and the central chain Sierra Madre, which forms the watershed of the country, and in which lie the principal gold and silver mines. See CORDILLERAS. Popocatepetl is the loftiest peak in Mexico, being some 18,000 feet above the sea, and is an active volcano in an almost constant state of eruption. The Mexican silver mines occur where the tableland unites with the mountain chain. Between the isthmus of Tehuantepec and that of Panama there are nearly forty volcanic mountains, with heights ranging from 3000 to 13,000 feet above the sea.

The river systems are numerous, but are necessarily limited, from the narrowness of the territory through which they flow. The only important river is the Rio del Norte, which, after a course of 2000 miles, including its windings, enters the Gulf of Mexico at about 25° N. latitude. Its total drainage area is estimated at 250,000 sq. miles. There are many small lakes on the tableland at various elevations. The largest is Lake Nicaragua, which is 100 miles long and 50 broad, and has an area of 4400 sq. miles.

The zoology of Central A. includes the puma, wolf, jaguar, wild boar, black tiger, tiger-cat, ocelot, opossum, racoon, tapir, peccary, sloth, armadillo, and monkey.

The areas and population of the various countries in the following table are from the *Almanach de Gotha* for 1875:—

Governments.	Area in Square Miles.	Population.	Capitals.
Mexico	741,820	9,134,128	Mexico.
San Salvador	7,337	600,000	San Salvador.
Nicaragua	58,170	250,000	Managua.
Honduras	47,108	351,700	Comayagua.
Guatemala	40,792	1,194,000	Guatemala.
Costa Rica	21,502	185,000	San Jose.
Total	916,729	11,714,828	

SOUTH AMERICA is triangular in shape, and its vertex lies southward, like the corresponding continent of Africa in the Old World. Its greatest length is 4700 miles, its greatest breadth 3150, and its total area 7,000,500 sq. miles. It has a coast-line of 15,800 miles, and on the side of the Caribbean Sea and the Atlantic there are many bays and excellent harbours, but on the Pacific side the seaboard is almost unbroken. The continent is marked by great plains or terraces at various elevations, between the great chain of the Andes, on the W. and the lower mountains of Brazil on the E., and is watered by the most magnificent river systems in the world.

The chief islands of South A. are the Galapagos, W. of Ecuador; Chinchá Island, W. of Peru; Juan Fernandez, W. of Chili; Chiloe and Wellington, W. of Patagonia; Tierra del Fuego, S. of Patagonia; Falkland Isles, E. of Patagonia; and Curaçao, N. of Venezuela. The Antilles have already been mentioned in connection with North A., but they belong nearly as much to South A., and are indeed supposed at one time to have linked the two continents together, converting the Caribbean Sea and Gulf of Mexico into landlocked seas or vast lakes.

The great mountain chain is the Andes (q. v.), which extends from the isthmus of Panama, in a triple range, as far as Bolivia, and afterwards in a single range to the extremity of the land at Tierra del Fuego. It is almost entirely volcanic, and ranging close to the western coast, it exercises a remarkable effect on the climate. The prevailing winds being easterly as far S. nearly as Valparaiso, the vapours with which they are still loaded after passing over the continent are arrested by the mountain heights, and the rain being thus all but completely diverted into the drainage of the eastern slope, the narrow strip on the western side is converted into a sandy desert. Brazil is partly intersected by an intricate and extensive mountain system.

As to river systems, the most gigantic is the Amazon (q. v.), with a drainage area of over 2,000,000 sq. miles. It rises at a great elevation in Upper Peru, receives at least twenty splendid rivers, and after a course of 4000 miles it enters the Atlantic without delta, discolouring the ocean for a distance of over 400 miles from land. Only inferior to the former is the Rio de la Plata, or Parana, which rises in Brazil, and has a course of 2150 miles. Its chief tributaries are the Uruguay, the Salado, the Paraguay, and the Pilcomayo, and it flows into the Atlantic after watering the N.W. of La Plata. It is subject to inundations, occasionally overflowing whole provinces many thousand square miles in extent. Next in importance is the Orinoco, lying towards the N. of the continent. It rises in the Andes, flows through an extensive region of impenetrable forest, is connected by a natural canal with the Amazon, and enters the Atlantic in the extreme W. of Venezuela. It drains an area of 300,000 sq. miles, and is 1500 miles long, 1000 of which are navigable. There are many other large rivers flowing into the Atlantic and the Caribbean Sea, some of which exhibit the peculiar phenomenon of *anastomosis* or interlacing; but on the entire W. side of the Andes the only river worth mentioning is the Guayaquil of Ecuador. Titicaca is the only lake of great dimensions, and is 115 miles long, from 30 to 60 broad, and at least 13,000 feet above the sea.

The tablelands in the northern part of South A., and between the parallel ridges, are of great elevation. Many are 12,000 feet above the sea, and are well-cultivated regions, containing large cities and numerous villages. The tableland of Titicaca, in the Bolivian Andes, has an area of 150,000 sq. miles, and is populous and productive, being also a great mining centre. Some of these plains were inhabited by civilised peoples long before the Spanish invasion. In the basins of the Amazon and the Orinoco, and in parts of Patagonia and Buenos Ayres, occur many low plains. See PAMPAS, LLANOS, and SILVAS.

The zoology of South A. is extensive and peculiar, embracing a fourth of all the known mammals, among which, however, are almost none of the wild animals so abundant in Africa and Asia. The most powerful of the carnivora is the jaguar, which is indeed the only formidable beast of prey in the whole continent. Of the other animals may be mentioned the great tapir, peccaries, sloths, ant-eaters, armadillos; the llama, the chinchilla, and the monkey. Many of the species are peculiar to South A., and are not found elsewhere. Among birds the most notable are various parrots, humming-birds, flamingoes, toucans, and arcaris. Chief among the reptiles are alligators and rattlesnakes.

In South American geology the Cretaceous or Chalk rocks, like the Oolitic beds, can be traced from Columbia to Tierra del Fuego. The Eocene rocks of the Kainozoic Period are also well represented. The Recent Period gives us the remains of animals belonging to orders of mammals which occupy that region in the present day, with the addition, that the fossil species present the characters of existing species greatly intensified. Thus the gigantic extinct sloths, mylodon and megatherium, the extinct armadillo-like glyptodon, the extinct llama or auchenia, &c., are all represented by less typical existing species.

The botany or vegetable kingdom in South A. has a magnificent development, particularly in the vast tropical territory E. of the Andes, the basins of the Amazon, the Orinoco, and their tributaries, where the genera and species are more abundant, the forests larger, and the forms more gigantic than anywhere in the Old World. Besides its palms, it has dye-woods of all sorts, cedar, mahogany, ebony, &c.; farther S. are the araucarias of Chili, and the beech forests of Patagonia. North A. has also a superb flora, including the pines and beeches of the Dominion of Canada; the poplars, pines, oaks, beeches, maples, and hazels of the United States; and the dye-woods, rosewood, and ebony of Mexico.

From the *Almanach de Gotha* for 1875 we take the following statistics:—

Governments.	Area in Square Miles.	Population.	Capitals.
Brazil	3,288,113	10,196,238	Rio de Janeiro.
Venezuela	403,275	1,784,194	Caracas.
Guiana, British	85,495	193,491	Georgetown.
Guiana, Dutch	46,073	52,105	Paramaribo.
Guiana, French	46,881	24,897	Cayenne.
United States of Colombia	320,747	2,910,329	Bogota.
Ecuador	248,385	1,308,082	Quito.
Peru	510,445	2,500,000	Lima.
Bolivia	536,200	2,000,000	Chuquisaca.
Argentine Republic	1,619,955	1,877,490	Buenos Ayres.
Uruguay	83,859	450,000	Monte Video.
Paraguay	56,734	221,079	Asunción.
Chili	132,645	2,003,346	Santiago.
Patagonia	364,864	5,000	Patagones.
Falkland Islands	4,741	803	Port Louis.
Total	7,748,342	25,527,054	

See Humboldt, *Examen Critique de l'Histoire et de la Géographie du Nouveau Continent* (5 vols. 1836-39); Macgregor, *The Progress of A. from its Discovery to 1846* (2 vols. 1847); Squier, *The States of Central A.* (1857); Kohl, *Geschichte der Entdeckung von A.* (1861); B. F. de Costa, *The Pre-Columbian Discovery of A.* (1867); Disturnell, *Influence of Climate in North and South A.* (1867); and Dr. Brinton, *The Myths of the New World* (1868).

America, British. A name strictly applicable only to the entire Transatlantic possessions of Britain in North, Central, and South A., but generally used as an equivalent for British North A., comprising the whole of the Dominion of Canada, together with the still unincorporated colony of Newfoundland. Although inferior in population, B. A. is equal in area to the American Republic, and greatly superior to any other of the western governments. This vast extent of territory yields the utmost variety of material products, and embraces many of the most valuable commercial and military positions in the New World. For a complete list of the British possessions in A., see the tables in the preceding article; and for descriptions of the different states, see separate articles under their respective heads.

America, Russian. See UNITED STATES.

America, Spanish. the name applied to Porto Rico and Cuba (q. v.), now all that remains of the Spanish territories, which at one time embraced the entire continent.

Americanism (comp. Scotticism), a term, phrase, or form of expression, the use of which is peculiar to America. Formerly each division of the Union had its own distinguishing forms of expression—those of the Western States having their origin usually in character stories, and in the application of the habits of animals to human devices under specified conditions; those of the New England and maritime States serving to illustrate the contingencies, expedients, triumphs, and vicissitudes of commercial life, &c. In our own time, however, so rapid and ready is railway communication over the American continent, that now true humour may be said to have no locality, and the aphorism which springs up this month in California may be found flourishing next month in New York. Dr M. Shele de Vere (*The English of the New World*, Scribner, 1873) states that 'the largest part of so-called Americanisms are nothing more than good old English words.' But the true A. is a manifestation of the humour of the country concentered in the form of a term or phrase. For the mass of Americanisms in common use the reader is referred to Bartlett's *Dictionary of Americanisms* (New York, 1848), the *English Language in America, Cambridge Essays* (1855), and J. R. Barley's *Dictionary of Americanisms* (4th ed. Boston 1877). The habits of the racoon and opossum have given rise to many specimens, some amusing, all picturesque or graphic. From the well-known habit of these of taking refuge in a gum-tree when pursued, a 'gum-game' is now the favourite word for any sly attempt to get out of a difficulty; a 'tree'd coon' is used to describe a man who has had recourse to his last expedient; and to 'bark up the wrong tree,' as the sportsman's dog occasionally does, means to go on the wrong track, or pursue an unconvincing line of argument. Many Americanisms are simply vulgarisms, borrowed from their extravagance; thus we hear of a 'lady rubbing her gums,' i.e. wiping her goloshes, 'on the door-mat.' Me-

taphorical Americanisms, having their origin in humorous stories, date for the most part from the Western States: thus 'to acknowledge the corn' means to confess, to own a fault; to 'cave in,' to collapse, as the earth sometimes does when 'caves' are dug beneath it. To 'pull up stakes' means to pack up and be off; to 'fizzle out,' to be quenched; to 'fix one's flint,' to settle or do for; 'big-bugs' are people of consequence; 'all-standing' means without preparation; to 'hurry up the cakes' is to be active. Among Americanisms may be classed the curious Anglo-German patois in use (of necessity) by German settlers, which is so admirably exemplified in the *Ballads of Hans Breitmann* (see LELAND); but the extraordinary orthography of Artemus Ward, and of Josh Billings, Mark Twain, and others, can no more be termed a distinctive A. than the Cockney spelling of Sam Weller in the *Pickwick Papers* can be termed an Anglicism.

Amerigo Vespucci, navigator and discoverer, whose Christian name has been given to *America*, was born at Florence, of a good family, 9th March 1451. At an early age he showed a liking for the physical sciences, and in 1486 he was engaged as a factor in a Florentine commercial house in Seville. While thus employed, the passion for discovery, which, after the great achievement of Columbus, seems to have inflamed all navigators, seized A. He made four voyages to the New World in the capacity of naval astronomer, the first and second in 1499-1500, in expeditions under the auspices of Spain; and the third and fourth in 1501-4, in the service of Portugal. In 1508 he obtained the appointment of pilot-major under the Spanish government. His principal duty in this office, which he retained till his death, was to examine persons seeking licences as pilots in the use of the astrolabe and quadrant, and in the practice as well as the theory of their business. He died at Seville, 22d February 1512. In Germany a confused account of A.'s voyages was written by one Waldseemüller, who was utterly unknown to Vespucci, and who proposed that the new region should be called *Americi terra*. The name passed into geographical charts, and so established itself. But Humboldt has clearly shown (*Cosmos*, Bohn's transl., vol. ii. pp. 676-81) that A., who was a man of high character, and greatly esteemed by Columbus, was absolutely free from blame in this matter.

Aersfoort, an old town of Utrecht, in the Netherlands, situated on the navigable river Eem, which enters the Zuiderzee. It has a beautiful church, with a tower 300 feet high, and carries on an important trade in grain, and a considerable manufacture of cottons, woollens, leather, soap, and beer. In the vicinity are several tobacco plantations. A railway connects it with Utrecht and Zwolle. A. is mentioned in documents as far back as 1006, but first obtained a town charter in 1259. It is the birthplace of the famous statesman Oldenbarneveld. Pop. (1869) 13,298, of whom nearly one-half are Catholics.

Ametabol'ic Insects. This name, signifying 'without change,' is applied to indicate collectively the three lowest orders of insects, distinguished familiarly by their undergoing no *Metamorphosis* (q. v.) These forms accordingly come from the egg in much the same state as that in which they pass their adult life, the young insect not differing from the perfect being save in size. They may moult frequently during their consequent increase in size, but the absence of a defined series of changes, such as is seen in the butterfly, beetle, &c., constitutes a marked difference between these and higher insects. The A. I. are the *Mallophaga* (bird-lice), *Thysanura* (spring-tails), *Aptera* (lice).

Ametyst, a variety of quartz or rock-crystal, of a fine purple or bluish-violet colour, extensively used for cutting as a gem for personal ornament. The colour of A. is supposed to be due to the presence of a minute proportion of manganese in its composition. The finest A. comes from India, Ceylon, Siberia, and Brazil; but qualities suitable for jewellery are also found in Austria, Saxony, France, and Spain, and a vein of good colour exists at Kerry Head, in Ireland. A variety of the sapphire, of a purple colour, is known under the name of Oriental A.

Amherst, town in the district of the same name, British Burmah, about 30 miles S. of Moulmein by river. Founded in 1826 as the capital of the province of Tenasserim, and called after the Governor-General. It is now only a summer sanatorium

for the inhabitants of Moulmein, a pilot and telegraph station. The district of A., lying between the Dawna Mountains and the Gulf of Martaban, has an area of 15,205 sq. miles. Pop. (1876) 275,432. The staple products are rice and teak. The chief town is Moulmein (q. v.). In 1875-76 the exports were valued at £1,184,000; the imports at £598,000.

Amherst, a town in Hampshire, Massachusetts, U. S., on a tributary of the Connecticut, 82 miles W. of Boston. It has a considerable and increasing trade. Pop. (1870) 4635. *A. College*, one of the most flourishing colleges in America, is situated near A., and was founded in 1821. It has fifteen professors, and possesses a large library, a museum, and an astronomical observatory.

Am'iens, capital of the department of Somme, and of the former province of Picardy, France, is situated on the river Somme, in the midst of a richly-cultivated plain. It is a junction for numerous railways, and has considerable manufacturing activity, especially in textile fabrics. Its grandest building is the cathedral, a magnificent specimen of Gothic architecture, built 1220-88 by Robert de Luzarche, Thomas de Cormon, and his son Renault. It is the birthplace of Peter the Hermit, but is best known from the Peace of A., signed here March 27, 1802, between England, France, Spain, and Holland. In the war of 1870 it was taken by General Manteuffel. A. is a very old city. It was known to the Romans under the name of *Samarobrica*, and was the capital of the *Ambiani* in Gallia Belgica in Caesar's time. After many vicissitudes, it was finally brought under the authority of the French crown by Louis XI. in 1477. Pop. (1872) 54,499.

Amiot or Amyot, Joseph, a French Jesuit missionary in China, born at Toulon in 1718, sailed for the East in 1750, and died at Peking in 1794. He was the first to make known, in anything like an exact and scholarly manner, the literature and history of the Chinese, and later sinologists have liberally availed themselves of his labours. His most important works are his translation of part of the Chinese classics on military art (*Art Militaire des Chinois*, &c., Paris, 1772); *Abregé Historique des Principaux Traits de la Vie de Confucius* (Paris, 1787); *Dictionnaire Tartare-Mandschou Français* (Paris, 1789); and *Alphabet Tartare-Mandschou* (1807). Numerous essays, treatises, &c., of A. are to be found scattered through the sixteen volumes of *Mémoires concernant l'Histoire, les Sciences, les Arts, et les Usages des Chinois* (Paris, 1776-1814).

Am'leth, or Hamleth, Prince of Jütland, the original of Shakespeare's Hamlet, assigned to the 2d c. B. C., but now generally regarded as a purely mythical personage. Saxo-Græmaticus says he was the son of Horvendill and Gerutha; and that after his father's assassination by his uncle Fengo, who then married Gerutha, he feigned madness to secure his own safety. His stabbing a spy found hiding among some straw, and his reproaching his mother till she promised to aid him in avenging his father's death, and many other incidents, are reproduced in Shakespeare's play. Tradition still points out the tomb of A., and the spot where his father was assassinated.

Am'lwch, a town of Anglesey, N. Wales, 20 miles N. E. of Holyhead. It lies on the N. coast of the island, and near it are the rich copper mines of the Parys Mountain. There are several smelting-furnaces, and alum and vitriol works. A. has a large harbour, and is the terminus of the Chester and Holyhead Railway. Along with Beaumaris, Holyhead, and Llangefni it returns one member to Parliament. Pop. (1871) 2968.

Ammana'ti, Bartolomeo, a Florentine sculptor and architect, born 1511, died 1592. He decorated the Capitol with sculptures for Pope Julius III., was employed as architect by Cosmo de Medici, and completed the famous Pitti Palace. An ardent admirer of Michael Angelo, his architectural works evince magnificence of conception. His bronzes are admired for their delicacy.

Ammergau. See OBER-AMMERGAU.

Ammia'nus Marcellinu's, a Roman historian of the 4th c., and the last Roman writer who composed a secular history in Latin. According to Libanius, he was born at Antioch in Syria about 330 A. D. The greater part of the life of A. was passed in military service. He took part in the unfortunate expedition of

Julian against the Persians, and subsequently served under Valentinian Valens, Gratian, and Theodosius, who ascended the throne in 379. His last years, however, were spent at Rome in literary leisure. A.'s work, entitled *Resum Gestarum Libri XXXI.*, is reckoned a sequel to Tacitus, whose style he unsuccessfully imitates; but the first thirteen books, embracing Roman history from 91 A. D., when Tacitus stops, to 352 A. D., are lost. The remaining eighteen, however, from 352 to 378, in spite of certain lacunæ or gaps, are invaluable as the records of events of which the author was mainly an eyewitness. His geographical, archaeological, and ethnological digressions possess the greatest interest, as, for instance, his chapters on the Saracens, the Huns, the Germans, &c., and on Egypt, Persia, Pontus, and Thrace. The question has been much discussed whether A. was a pagan or Christian, but it remains undecided. The best edition of his history is that by Wagner and Erfurdt (3 vols., Leipz. 1808).

Am'mon, or Amun, a god of Egypt, holding the highest rank, and whose name signifies the unrevealed. The Greeks identified him with Zeus, and the Romans with Jupiter; hence his city, *No-Amon* (Nah. iii. 8), is translated into Greek by *Diopolis*. His peculiar residence was Thebes, but his worship spread to Greece and Rome, and his temples were numerous and splendid. He is confounded with two other deities, the sun-god Ra, and Kneph.

Ammon, Christoph Friedrich von, a learned German theologian, born at Baireuth, January 16, 1766, died at Dresden, May 21, 1850, is best known by his work on the *Fortbildung des Christenthums zur Weltreligion* ('Development of Christianity as a Universal Religion,' 4 vols., Leipz. 1833-40), in which he seeks to show that the highest outcome of theology is to reconcile the gradual development of the Christian doctrines of faith with the continual progress of science. Of his other works the chief are *Entwurf einer rein Biblischen Theologie* ('Scheme of a pure Biblical Theology,' 3 vols., Gött. 1801-2); *Wissenschaftlicher Entwurf der Christl. Sittenlehre* ('A Scientific Scheme of Christian Ethics,' 6 vols., Erl. 1793); *Handbuch der Christl. Sittenlehre* ('Handbook of Christian Ethics,' 3 vols., Leipz. 1823, 2d ed. 1838); *Leben Jesu* ('Life of Jesus,' 2 vols., Leipz. 1842-44); and *Die Wahre und Falsche Orthodoxie* ('The True and the False Orthodox,' Leipz. 1849). His second son, Friedrich August A. (born 1799, died 1861), was a well-known writer on medical subjects in Germany.

Ammonœ'mia is poisoning of the blood by the accumulation of carbonate of ammonia, resulting from the decomposition of urea in cases of suppression of the functions of the kidney. See URÆMIA; KIDNEY, DISEASES OF.

Ammonia is a gaseous compound of nitrogen and hydrogen. Solution of A. has probably been known from the earliest ages, but it is first mentioned by the alchemist Raymond Lully in the 13th c., who obtained it by distilling urine. The solution was called by him *Mercurius vel spiritus animalis*. Basil Valentine, in the 15th c., prepared solution of A. from sal-ammoniac, but retained Lully's name for it. Bergmann (1782) first called it A., either from A., a Cyrenaic territory, or from Ammon, a title of Jupiter. A. occurs in nature combined with acids. Air contains very small quantities of carbonate of A.; drinking-water very frequently nitrate or nitrite of A.; and free or uncombined A. is always evolved from decomposing animal matters. A. is now prepared from coal-tar, which contains considerable quantities. The tar is washed with dilute hydrochloric acid, which combines with the A. to form chloride of ammonium (sal-ammoniac), a very soluble salt, whilst the tar remains undissolved. The solution is siphoned off from the tar, evaporated to a sufficient extent, and allowed to cool, when the sal-ammoniac separates in crystals. A. is prepared from sal-ammoniac by heating the latter with slaked lime; chloride of calcium remains in the retort, whilst A. escapes as a gas. In manufacturing this operation is carried out in iron vessels.

A. is a colourless gas, lighter than air (sp. gr. '59 rel. to air), and of suffocating, characteristic smell. It is exceedingly soluble in water, 1 volume of that liquid dissolving 670 volumes of the gas at ordinary temperature. Strong solution of A. is known in pharmacy as *liquor ammonia*. The characters of the solution are those of a true alkali (see ALKALI); it has a soapy, caustic taste, corrodes organic tissues, restores the blue colour to litmus reddened by an acid, and combines with acids to form important

and well-marked salts. It precipitates many metals from solutions of their salts, as hydrates (hydrated oxides), and for this reason is a valuable reagent in chemical analysis.

Solution of A. is used in medicine both externally and internally. Hartshorn and oil is a kind of soap prepared by mixing *liquor ammoniæ* with olive oil.

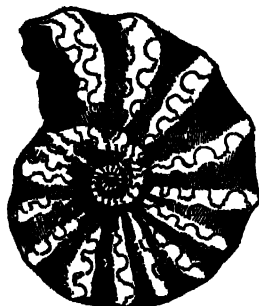
A. (gas) is composed of 14 parts by weight of nitrogen to 3 parts of hydrogen, and is represented by the formula NH_3 .

The salts of A. are numerous, and in many cases important. Sulphate of A. is largely used as a manure. Carbonate of A., or common smelling-salts, is a valuable medicine; its solution is known as sal-volatile. Nitrate of A. is resolved by heat into 'laughing-gas' and water. Chloride of ammonium, besides being the chief source of A. itself, is eaten by the peasants of Russia instead of common salt. The salts of A. resemble very closely the corresponding salts of potassium, and are regarded by chemists as compounds in which the group NH_4 (ammonium) plays the part of a metal. This group, however, is only known in combination.

Ammoni'acum, a drug obtained from *Dorema ammoniacum*, an Umbelliferous plant, native of Persia. When the stem is punctured, the milky juice exudes in tears, and becomes yellowish on exposure, forming the gum-resin, like *Asafoetida* (q. v.) The A. is also obtained from *Ferula tingitana*, another Umbelliferous plant, found in the northern parts of Africa.

Am'monites, a race descended from Ben-ammi, the son of Lot, occupying the desert district to the E. of Gad. They waged incessant warfare against the Israelites, and were defeated successively by Jephthah, Saul, David, Uzziah, and Jotham, and, after the captivity, by Judas Maccabæus, after whose time they disappear from history, and were probably merged in the general body of Syro-Arabbians. According to Josephus, Antiochus the Great destroyed the walls of Rabbah, their capital (B.C. 198). Their chief deity was Milcom, or Moloch.

Ammonites, a family of extinct Tetrabranchiate, or 'four-gilled' cuttlefishes, or Cephalopoda, represented in a fossil state by their many-chambered shells. They form the type of the family *Ammonitidae*, which differed from the family *Nautilidae*—including the existing pearly nautilus—in possessing the *septa*, or partitions between the chambers of the shell, of a folded or complex nature. The *siphuncle*, or tube passing through the septa, and bringing the chambers into communication, pierced the septa on their external or dorsal aspects. The A. form fossils pre-eminently characteristic of the Mesozoic rocks, but they first appear in the Lower Silurian formations (*Bacrites*), and in the Upper Silurian rocks also (*Goniatites*). They became extinct at the close of the Cretaceous or Chalk Period. Baculites, hamites, scaphites, turritiles, &c., are genera included in this family.



Ammonites (Ceratites)

Ammo'nium, an oasis in the Libyan Desert, 6 miles long and 3 broad, has a place in history as the site of a temple dedicated to Amun or Ammon, the Egyptian Jupiter, and famous for its oracle, to which pilgrims resorted from all parts of Æthiopia and Egypt. When Alexander the Great visited the spot in the course of his conquest of Egypt, the priests saluted him as the son of the god. The ruins of the temple, which was not large, still exist, and prove its Egyptian order and character, but Greek influences (from Cyrene) affected the worship at an early period. There are numerous springs and fountains in A., one of which, called the 'Fountain of the Sun,' is somewhat tepid, and at night is distinctly warmer than the surrounding atmosphere. In the time of Herodotus the inhabitants were partly Egyptian and partly Æthiopian. The soil was and is extremely fertile, producing dates in vast quantities, pomegranates, and other fruits, which are exported by caravans to Egypt and the ports of the Mediterranean. A. is still governed by its own sheikhs, who pay tribute to the Khedive of Egypt.

Ammonius Saccas, who founded the Neoplatonic School, flourished in the 3d c. A.D. In his youth he was a porter at

Alexandria, whence the appellation of *Saccas*, i.e., sack-carrier. He was born of Christian parents, but is said to have apostatized, though this is denied both by Eusebius and Jerome. His system was eclectic, and attempted to harmonise the tenets of the various schools, especially those of Plato and Aristotle. Longinus, Herennius, Origen, and Plotinus were his most distinguished pupils. He died A.D. 243, leaving no written exposition of his system.

Ammoph'ila, a genus of grasses. *A. arundinacea*, or *Panama arenaria*, is called marrem, sea-reed, or mat-grass, and is extensively planted both in England and in Holland to bind sandbanks, and prevent the sand being blown inland.

Ammu'ni'tion, the general name given to explosive substances and projectiles used with cannon, rifles, and fowling-pieces, and comprising gunpowder and its modern substitutes gun-cotton, gun-felt, and wood-powder, shot, shell, caps, wads, bullets, &c., either apart or combined in a cartridge. In warfare A. forms one of the most important parts of the equipment of an army, whether for offence or defence, while the usefulness to mankind in general as an aid in the destruction of the more dangerous animals, and in procuring game for food, can hardly be exaggerated. The A. for the British army, navy, and reserve forces is made up chiefly in the Royal Laboratory at Woolwich, where immense quantities of all kinds required for military purposes are kept in store, and distributed to the various stations and depôts occupied by our troops at home and abroad as occasion requires. The different kinds of A. in use will be described under their proper heads.

Amne'sia is a peculiar condition met with in persons suffering from certain kinds of brain disease, in which the person has entirely forgotten the meanings of words. He cannot think intelligibly in words. He may repeat words after another without attaching any meaning to them. Along with this condition the mental powers are usually considerably impaired. A. is not to be confounded with aphasia. See APIHASIA.

Amnesty (Gr. *amnestia*, forgetfulness, i.e., of wrong done) is a political term denoting an act of pardon or oblivion for offences committed against the state. Sometimes an A. excludes from its operation particular individuals, who are then mentioned by name. Instances of such exclusion occur in the history of every nation that has witnessed violent changes, as in the case of William Wallace in Scotland, and of the English 'regicides' at the restoration of Charles II.

Am'nion is one of the embryonal sacs developed from the external germinal layer of the embryo of a vertebrate animal, and ultimately enclosing it. See EMBRYO. It contains a fluid called liquor amni, in which the embryo floats, consisting of water holding in solution about 3 per cent. of solid matter, composed chiefly of urea, uric acid, allantoin, chloride of sodium, and sulphate and phosphate of lime. The A. surrounds not only the embryo of the mammal, but also that of birds and reptiles. Amphibians and fish, however, which are developed in water, have no A. For a description of the relations and functions of the A., see EMBRYO.

Amol', or **Amul**, a town in the province of Mazanderan, Persia, on the Heraz, 12 miles from its mouth on the Caspian. It is partly decayed, but still has considerable trade. The only notable building is the mausoleum of Mir Burzuk, a king of A. who died in 1378. A bridge of twelve arches spans the Heraz. Near A. much rice and cotton are produced, and there are here native cannon-foundries. Pop. 35,000 or 40,000, but greatly less in summer, when many of the inhabitants retire to the Elburz Mountains. A. was founded in 793 by Harûn al Rashid.

Amo'mum, a genus of plants belonging to the order *Zingiberaceæ*. They are natives of warm countries, and are highly aromatic. Cardamoms and Grains of Paradise Spice (q. v.) are yielded by several species of A.

Amoor', or **Amur** (believed to be a corruption of *Mamu*, the name given to it by the natives near its mouth), a great river of North-Eastern Asia, and politically interesting as in part marking the line of the Russian advance in the East. Its remotest head-water, the Kerlon (known in its lower course as the Argoun), rises in the Kentei Khan, or Great Kingan of the Chinese, and flows 970 miles N.E. to its junction with the Shilka at Ust Strelka. Here the A. proper begins, and from this point its

lower reaches are measured. The A. flows E. and S.E., receiving from the N. the Dzeya, 540 miles, and the Bereya, 703 miles, and the Sungari from the S., 992 miles from Ust Strelka. It then flows N.E., receiving the Usuri, to its embouchure in the Gulf of Tartary, between the seas of Japan and Okhotsk. Length of A. below Ust Strelka, 1890 miles; total length from source of Kerlon, 2860 miles. It is navigable by steamboat for 2200 miles, is the highway of considerable trade, and in its lower course flows through cultivable, well-wooded lands. It drains an area of 766,000 sq. miles. By the treaty of Pekin (1st January 1861) the course of the A. was recognised as forming the boundary between the Russian and Chinese empires from Ust Strelka to the confluence of the Usuri, a distance of 1179 miles. See Collins' *Exploration of the A. River* (New York, 1858), and Ravenstein's *Russians on the A.* (Lond. 1861.)

Amoor Territories. The ukase of 31st December 1858 provides that the A. T. shall be divided into the 'Province of the Amoor,' with an area of 164,000 sq. miles, and the 'Maritime Province of Eastern Siberia,' embracing the N. portion of Sakhalin, several maritime districts, together with Kamchatka and the Kurile Islands, area 744,715 sq. miles. Total pop. (1867) 22,297, chiefly Tungus. Principal port, Vladivostok, in communication with Europe by China submarine cable in 1872. This port was a station of observation of the transit of Venus, December 1874. See Schrenck's *Reisen und Forschungen in Amoor*, 1858-67 (4 vols. 1869), and Atkinson's *Travels in the Region of the Amoor* (Lond. 1868).

Am'orites ('highlanders'), a powerful Canaanitish nation, who perhaps originally occupied the hilly regions of Judah and Ephraim; at least they are found there on their first mention in Scripture. Afterwards they may have extended themselves to the pasture-lands of the Trans-Jordanic plateau. At any rate, it was here that the Israelites first encountered and vanquished them, when ruled over by Sihon, King of Heshbon, and Og, King of Bashan. Their lands were divided among Gad, Reuben, and Manasseh. Those dwelling W. of the Jordan offered a fierce and obstinate resistance to Joshua, and were never wholly extirpated.

Amoro'so, in music, tenderly, affectionately.

Amor'pha, a genus of Leguminous shrubs, natives of N. America. The species are very ornamental. *A. fruticosa* is common in gardens. A kind of Indigo (q. v.) is prepared from its young branches.

Amorphophallus, a genus of Araceous plants. See ARUM.

A'mos, a Hebrew prophet, flourished about 800 B.C. He was a herdsman of Tekoa, near Bethlehem, which accounts for his frequent allusions to rural pursuits and natural objects. The first six chapters of his prophetic writings denounce the idolatry of Israel; the remaining three contain visions of its overthrow and final restoration. The style is clear and vigorous, and the canonicity of the book is not disputed.

Amoy, a fortified city and seaport in the province of Fukien, China, built on an island of the same name, which lies in a small bay at the mouth of the Kiu-long-Kiang, opposite Formosa, 320 miles N.E. of Canton, and 135 S.W. of Foochow. It is divided by a hilly ridge into an outer and inner town, each having a capital harbour. For upwards of a thousand years it has been an important trading-place, and it was one of the five seaports opened up by the treaty with Britain concluded at Nankun in 1841. It was captured and plundered in 1853 by the Tae-ping rebels. The town is described by Mr Fortune as perhaps the dirtiest in the world. The chief imports are cotton-twist, British long cloths, rice, beans, and peas; exports—tea, sugar, paper, grass-cloths, and gold-leaf. The value of the imports, which are almost entirely English, was (1873) £1,443,847. Pop. (*Overland China Mail*, June 8, 1872) 350,000.

Ampère, André Marie, a French naturalist and mathematician, born at Lyon, January 20, 1775. After giving for some time private instructions in mathematics at Lyon, he repaired to Paris in 1805, and soon distinguished himself by his success as a teacher in L'Ecole Polytechnique. His first publication was his *Considérations sur la Théorie Mathématique du Feu* (1802).

In 1814 he became a member of the Academy of Sciences, and in 1824 Professor of Physics in the Collège de France. He died at Marseille, June 10, 1836. His researches in electro-dynamics paved the way for the experiments of Faraday, and his contributions to natural science were numerous and valuable. It would be impossible in our limits to give a list of his essays, memoirs, demonstrations, &c. Perhaps the most important are his *Recueil d'Observations Electro-Dynamiques* (Paris, 1822), and his *Théorie des Phénomènes Electro-Dynamiques* (Paris, 1830). A's character was a singularly beautiful one. He united a passion for science with an ardour of religious faith, rare in any country, and particularly in France. A most interesting account of his life and labours appeared in the *Revue des Deux Mondes* (February 15, 1837) from the pens of MM. Sainte-Beuve and Littré.

Ampère, Jean Jacques Antoine, son of the preceding, was born at Lyon, 12th August 1800. Educated at Paris under the eye of his father, he devoted himself zealously to the study of the literatures of Germany and England, and in 1830 became a lecturer on literature at Marseille. In 1833 he succeeded Andrieux in the Collège de France, and in 1847 was elected a member of the French Academy. In addition to his purely literary works, among which may be mentioned *De la Littérature Française dans ses Rapports avec les Littératures Étrangères au Moyen Age* (Paris, 1833), *Histoire Littéraire de la France avant le douzième Siècle* (Paris, 1839), and *Sur la Formation de la Langue Française* (Paris, 1841), he published in the *Revue des Deux Mondes*, in 1844, a well-written series of articles on his travels in Egypt and Nubia. On his return from his travels he devoted himself to the study of hieroglyphics, and acquired much facility in deciphering them. He died at Pau, March 27, 1864.

Amphibia (Gr. *amphi*, both; *bios*, life), a class of Vertebrate animals (represented by frogs, toads, newts, sirens, &c.), and distinguished by the fact of its members always possessing gills in early life, and lungs in adult life, whether the gills persist or not. The skin is for the most part destitute of scales, or other form of exoskeleton. The heart is three-chambered, and the circulation of imperfect nature. The skull is joined to the spine by two articular processes or 'condyles.' No fin-rays are ever developed. See BATRACHIA.

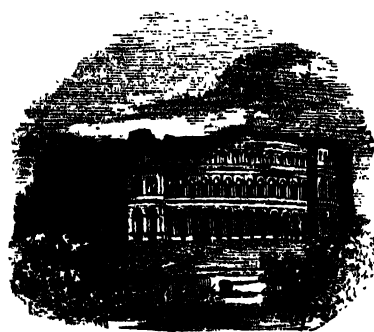
Amphico'elia (Gr. *amphi*, both; *kailos*, hollow), a name applied to those vertebrae or segments of the spine of Vertebrate animals which are of bi-concave shape—that is, hollowed at either end. In fishes this conformation is well seen. When two such vertebrae are articulated together, a cup-like cavity is formed by the approximation of the hollowed ends, and this form of joint gives great mobility to the spine, as required for the movements of the tail of fishes in swimming. In fishes, the cup-like cavity thus formed is filled with a gelatinous fluid, a 'universal,' 'water,' or 'ball-and-socket' joint being thus formed. In certain amphibians and reptiles, amphicoelous vertebrae are also found. This name is also applied to indicate an extinct group of crocodiles in which the vertebrae were of this description. *Teleosaurus* is an example of this latter group.

Amphic'tyonic Council, a celebrated council of ancient Greece. Its origin is obscure, but the common legend was that it received its name from Amphictyon, son of Deucalion and Pyrrha. Originally it assembled at Delphi, but latterly also at a village called Anthela, near Thermopylae. It was composed of representatives of twelve tribes, or, according to Æschines, of eleven; these were the Thessalians, Boeotians, Dorians, Ionians, Perrhæbians, Magnetes, Locrians, Ceteans, Phthioti, Malians, and Phocians. Demosthenes, again, excludes the Thessalians, and some other authorities include the Delopians. The objects of the council were to protect the temples, and to promote the worship of Ceres and of the Delphic Apollo, and to determine and arrange points of international law. The influence of the council appears to have been highly beneficial, by giving a national unity to the various tribes of which the Greek nation was composed. It seems also to have had a humanising effect in softening the lawless and aggressive spirit of the Greeks towards those not of the Greek name. The council survived the independence of Greece. So late as the battle of Actium, we find Augustus claiming a place in it for his new city of Nicopolis, and representatives continued to be sent at least as late as the age of the Antonines. It is even probable that the A. C. continued to drag out a meaningless existence till

the overthrow of Paganism. See Tittmann, *Über den Bund der Amphiktyonen* (Berl. 1812).

Amphipolis, an ancient city of Macedonia, situated on the left bank of the Strymon, just below its egress from Lake Kerkine (now Talkino), and about three miles from its mouth. It was founded by a Thracian colony, and formed an emporium for the woods of Kerkine and the gold mines of Mount Pangæus. It received its name from being nearly surrounded by the Strymon (Gr. *amphi*, around, and *polis*, a cit.). After repeated efforts A. was taken, 437 B.C., by the Athenians, from whom it was wrested, 424 B.C., by the Spartan Brasidas. The treaty of Antalcidas restored it to Athens, but it was again captured by Philip of Macedon. The Romans made it the capital of Macedonia. It is now a mere village, occupied mainly by Turks, and bears the name in Greek of *Neokhorio*, in Turkish *Jeni-Keni*, 'New Town.'

Amphitheatre, a building used by the Romans for their gladiatorial contests and other spectacles.



Amphitheatre.

In early times it was made of timber; but accidents arising from fire and instability, amphitheatres were afterwards usually made of brick or stone. They were often very costly and magnificent; the Colosseum of Rome, still in excellent preservation, being capable of holding over 85,000 people. It was finished in the reign of Titus, who celebrated its dedication by the slaughter of 5000 wild beasts.

It is 620 feet long by 513 broad. The amphitheatres of Verona and of Nîmes in Languedoc are also noteworthy. Both are in good preservation. In England, those of Dorchester, Silchester, and Cirencester may interest the antiquary.

Amphitrite, in Greek mythology, the daughter of Nereus and Doris, or, as others say, of Oceanus and Tethys, was the wife of Poseidon, and goddess of the Mediterranean, though represented by later poets as the goddess of the ocean in general. She is sometimes figured in ancient art seated on a triton, and having a trident in her hand.

Amphiuma, a genus of Amphibian vertebrata included in the order *Urodela* ('tailed'), and distinguished by the perennial or persistent nature of the gills—or at least of the gill apertures—with which in early life, like all other amphibians, they are provided. The A. is exclusively found in N. America, and lives in the mud of shallow rivers. The limbs are of small size. The eyes are small; eyelids being absent. These forms may attain a considerable size, the *A. tridactylum* frequently averaging three feet in length.

Amphora (Gr. *amphi*, on both sides; *phero*, to carry), a large pitcher-shaped vessel, used by the Greeks and Romans, with a narrow neck and two handles, and tapering below for insertion into a stand. It was also a measure for liquids, the Greek A. being nine and the Roman six English gallons.

Amplification, in rhetoric, is the enhancing of an idea or statement by presenting it with numerous accessories, and an accumulation of details to make a stronger impression. *Exaggeration* is a vicious mode of A.

Amplitude, in astronomy, is the distance of the point at which a heavenly body rises or sets from the E. or W. point of the horizon. It also indicates the distance, angular or otherwise, between the extreme positions assumed by an oscillating or vibrating body.

Ampulla, a bottle, usually of glass or earthenware, narrow at the mouth, and swelling in the middle, used by the Romans to hold liquids, especially the oil with which they anointed their bodies after bathing. This was the *A. olivaria*. Numerous specimens are to be found in collections of antiquities.

The unguent with which the kings of France were anointed at their coronation was contained in the *A. Romensis*, believed to have been conveyed from heaven by a dove. It was shattered in the great revolution of 1789.

Ampullæ are dilatations seen in the membranous portions of the semicircular canals in the internal ear. See **EAR**.

Amputation is the removal or separation of a part of the body. The term is usually applied to the removal of a limb. A. may be performed by one of four methods, viz.—(1) the circular method; (2) the oval method; (3) by flaps of various shapes and sizes; and (4) by making flaps of the skin and a circular cut through the muscles. The most important are—(1.) The circular method. The skin and fat are divided by a circular sweep of the knife, and dissected upwards a certain distance, varying according to circumstances. The muscles are then cut by another circular movement of the knife, the bone is laid bare, and sawn through as high up as possible. By this method abundant covering is obtained for the bone or bones, but the cicatrix is liable to be puckered. (2.) The oval method is simply a modification of that just described, but the sweep of the knife is oval instead of being circular. (3.) Flap A. This consists of making one or more flaps for covering the bone. There are three varieties: (a.) The *double-flap A.*, in which two flaps of equal size are made by transfixing with the knife the skin and muscles, and then cutting from within outwards. (b.) The *rectangular flap*, first devised by Mr Teale of Leeds, in which a long rectangular flap is cut from that side of the limb where the parts are generally devoid of large blood-vessels and nerves, while the short flap is made from the textures on the other side of the limb, the length and breadth of the longer flap being equal to half the circumference of the limb at the point of A., and the short flap one-fourth of the length of the long one. (c.) By the long flap, employed in such places as the shoulder or hip, where only one flap can be made. Teale's method of the rectangular flap is said to have the advantages of securing a perfect covering for the end of the bone, a dependent opening for suppurative discharges which may form during healing, and a cicatrix free from pressure. *Dangers of A.* The primary danger is hæmorrhage during the operation. This is arrested as far as possible by the Tourniquet (q.v.), or by manual compression by the fingers of assistants on the principal blood-vessel. After A. in unhealthy subjects, union of the flaps may not take place by what is called the 'first intention,' but there may be profuse suppuration. Sometimes, in bad hygienic conditions, erysipelas, with sloughing of the textures of the stump, may set in. The end of the limb, after removal of a portion, is called the stump. It should be formed of tissue able to bear compression, so as to admit of the use of an artificial limb. *Mortality after A.* This will be seen from the following table, from Erichsen's *Science and Art of Surgery*, vol. i. 35. It is compiled from various British, Continental, and American sources, and gives the results of over 9000 cases:—

SEAT.	Cases.	Deaths.	Per cent.
Shoulder-joint,	117	58	49'5
Arm,	1319	375	28'4
Forearm,	1059	109	10'2
Hip-joint,	46	19	41'3
Thigh,	3477	1224	35'2
Leg,	3006	985	32'7

This table clearly shows an increase in the mortality as the operation approaches the trunk. It is also found that age, general health, and the hygienic conditions in which the patient is placed, and also the seat of the A., whether the operation is done for disease or injury, and the time of the operation after the duration of the disease or the occurrence of the injury, materially affect the result of the operation.

Amritsar ('city of immortality'), a flourishing city and capital of a district of the same name in the Punjab, 44 miles N.E. of Lahore, on the Scinde, Punjab, and Delhi Railway. It is the sacred capital of the Sikhs, and its pool of immortality is held in greatest reverence. The multitude of pilgrims visiting A. early made it a centre of commerce, and it is now one of the richest cities in Northern India. It has a prosperous trade in shawls and Cashmere saffron, and considerable manufactures of cotton and silk goods. Pop. (1868) 135,813. The government district of A. has an area of 1556 sq. miles; pop. (1868) 832,750. It was acquired by the British in 1848.

Amster, Samuel, famous as an engraver of the works of Thorwaldsen and Raphael, and some time Professor of Engraving at the Academy of Arts, Munich, was born at Schinsnach in Switzerland, 17th December 1791, and died at Munich, 18th May 1849. His chief works are engravings of a 'Magdalen,' by Carlo Dolce; of 'Alexander's Triumphal Procession,' by Thorwaldsen; of the 'Burial of Christ,' 'Holy Family,' and 'Madonna di Casa Tempi,' by Raphael; and of Overbeck's famous 'Triumph of Religion in the Arts.'

Amsterdam (the dam of the Amstel), the capital of the Netherlands, and chief city in the province of Holland, stands on the S. bank of the IJ or Y, an arm of the Zuiderzee, where the Amstel flows into it. The city, which is almost entirely built upon piles, is in the form of a crescent, and is divided by the river and canals into 90 small islands. With its abundant spires, tall masts of ships, and brick-built houses, with their gables towards the streets, A. has a striking and picturesque appearance. The two principal canals are the Heerengracht and the Keizersgracht. There are about 300 bridges, one of which, the Hoge Sluis, is about 600 feet long, and has 35 arches, 11 of which are passable by large ships. New 'dams' have also recently been constructed, forming basins with room for nearly 1000 ships. The palace, formerly the Stadhuis (town hall), is a magnificent pile, remarkable for its coronation hall, above 100 feet long, lined with white marble. Among ecclesiastical edifices the most noteworthy is the *Nieuwe Kerk* (New Church), founded in 1408, in which are the tombs of Admiral de Ruyter and the poet Vondel. A. also possesses an Exchange (finished in 1845), an Academy of Arts and Sciences, three museums (the last, the *Museum Feodor*, dating from 1866), several theatres, numerous charitable institutions, &c. It is the headquarters of the Netherlands Trading Company, a corporation whose monopoly expired at the end of 1874, of the West India Company, and other commercial associations. The manufactures of A. are very important, and include the making of damasks and velvets, cotton-spinning, sugar-refining, the cutting of precious stones, printing, type-founding, the making of plate, &c. In 1875 there entered the port 1054 vessels of 415,034 tons. The pop. of A. in 1875 was 289,982, of whom the majority are Dutch Calvinists, the remainder being Roman Catholics, Lutherans, Jews, Baptists, &c.

In the 12th c. A. was merely a fishing-village. It was walled and fortified in 1482. It afterwards became the most important commercial town in the Netherlands, and in 1622 had 100,000 inhabitants. Its commerce in 1653 had been greatly reduced by the war with England, but it again rose into prosperity in the 18th c., and down to the period of the French Revolution it continued to be one of the first marts in Europe for the products of the East and the West. The union of Holland with France in 1810, however, destroyed its foreign trade; but after the fall of Napoleon its prosperity began to revive, and it now is one of the first seats of commercial industry and enterprise. A. is also the central point of the Dutch line of fortification. The city itself can be made inaccessible by sluices, which lay the neighbourhood under water, and it is at the same time strongly defended by numerous forts.

Amulet (probably from the Arabic *hamalet*, a pendant), an image, figure, or mysterious inscription upon a stone,

metal, or other material, and carried about as a preservative against illness, enchantments, and similar evils. Such charms have always been popular in the East; and even in the West at the present day, medical preparations are regarded

by many as preventives of any bodily malady. The Emperor Caracalla, about A. D. 216, prohibited the use of them among the Romans, who made them of gems of various kinds. Necklaces and other ornaments, evidently intended as charms, are found among Druidical remains. Among well-known kinds of amulets may be mentioned the early Christian Ichthus (q. v.), the Arabian Talisman (q. v.), and the perforated coins of St Helena, the

moth, Constantine the Great. See Kopp's *Palaographia Critica*, (Mh. 1829), and Ewele, *Über Amulette* (Mainz, 1827).

Amurath or **Murad**, the name of four Ottoman emperors, at least two of whom have obtained a place in history. A. I., son of Orkhan, was born in 1326, succeeded his father in 1360, and in the same year carried the Turkish arms into Europe, and commenced those deadly and incessant attacks on the heart of the Greek empire which only ended with the fall of Constantinople. In his first campaign A. captured Adrianople, which henceforth became his European capital; and in the course of a reign of nineteen years made himself master of Bulgaria, Servia, and all Macedonia as far as the borders of Albania. He died in 1389, on the battle-field of Kossova, stabbed by the dagger of a wounded Servian. A. was a great warrior, a man of indomitable will, and fanatically loyal to the religion of Mohammed; but like most fanatics, he did not love science, and scholars received no favour at his court.

Amurath II., born 1404, succeeded his father, Mohammed I., in 1422, and ruled for nearly thirty years. His whole career is a laborious, but on the whole successful, struggle to establish and extend the power of the Turk in Europe. In the beginning of his reign the Greek emperor Emmanuel sought to embarrass him by restoring to freedom Mustapha, son of Bajazet, who was the legitimate inheritor of the throne. But the attempt of the latter ended disastrously, and Constantinople itself was nearly stormed by the victorious A. The suppression of an insurrection in Asia Minor, the conclusion of a treaty of peace with the Emperor Joannes, successor of Emmanuel, by which A. obtained a great number of cities on the shores of the Black Sea and on the river Strymon, the conquest of Thessalonica (1429) in Macedonia, and of Janina (1431) in Albania, were the chief incidents in the first ten years of his reign. Then followed the conflict between A. and the Prince of Servia, fomented by the King of Hungary, which ended in the conquest of the Servian principality; but the appearance on the scene of the famous Hungarian, John Hunyades, soon changed the aspect of affairs. The Ottoman forces were driven from Belgrade, routed at Hermanstadt, at Vasag (1442), at Nissa (1443), at Yalowaz (1444), and A. was forced to conclude a peace. War, however, soon broke out afresh, and the defeat and death of the Hungarian king Vladislaus, who had invaded Bulgaria, showed that A. had lost none of his military skill. This success was followed by the reduction of Peloponnesus, the invasion of Albania—where the heroic Scanderberg for a time resisted and repelled the Ottoman arms—and by the renewal of the war with Hunyades, who was utterly routed in the great battle of Kossova (17th–19th October 1448). A. died 9th February 1451. His reign was brilliant both in arts and arms. Poetry, theology, and jurisprudence had distinguished representatives; and the sultan himself inspired his enemies with respect and his subjects with love.

Amurnath, a remarkable cave in the N.E. of Cashmere, about 500 yards long, 30 high, and 100 wide. The Hindus, who visit it in great numbers, regard it as the home of the god Siva. It contains myriads of doves, which, flying out and in, are supposed to convey to the god the prayers of the pilgrim.

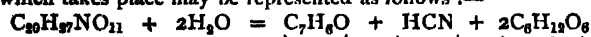
Amyclæ, an ancient Laconian town, on the right bank of the Eurotas, about 2½ miles S. of Sparta, was famous in the heroic age as the abode of Tyndarus and Leda, and the birth-place of Castor and Pollux, who are hence called the *Amyclæan brothers*. A. is mentioned by Homer, and it continued to be an independent Achæan town long after the subjugation of the rest of the Peloponnesus by the Dorians, but was conquered by the Spartans shortly before the first Messenian war, after which it sank into a village, memorable only for the annual celebration of the Hyacinthia, and for the temple and colossal statue of Apollo. The Italian A., on the Campanian coast, was founded by colonists from the Laconian A.

Amygdalæ are what are known as the tonsils. They are two glands which occupy the recesses between the anterior and posterior pillars of the fauces on each side of the throat. They consist of a series of small follicles lined by epithelium, and have thick walls enclosing little capsules or shut sacs, which are filled with a greyish-white substance containing numerous free nuclei and cells. The function of these bodies is unknown. Sometimes they become hypertrophied by repeated inflammations in

young individuals of a strumous constitution. They may then be removed without any injurious consequences. The tonsils are also liable to acute inflammation, causing tonsillitis or quinsy. There is then swelling, pain, difficulty in swallowing and in articulation. The inflammation may terminate either in resolution or in suppuration. The abscess formed by suppuration may open without interference, or it may be necessary to open it by an incision. During the early stages of the affection poultices and hot fomentations are required, while salines, such as the acetate of ammonia, combined with sulphate of magnesia and spirit of nitric ether, may be given to diminish feverishness.

Amygdaleæ and **Amygdalus**, the order and genus to which many cultivated fruit-trees belong, such as the almond (*A. communis*), the peach and nectarine (*A. persica*), the cherry (*Prunus cerasus*), the plum (*P. communis*), and the apricot (*P. armeniaca*). Some authors treat *A.* as a sub-order of *Rosacea* (q. v.) The plants possess hydrocyanic acid in their leaves and seeds.

Amygdaline is a crystalline compound contained in bitter almonds, and belongs to the group of bodies called *glucosides*—substances which readily take up water and split into *glucose* or *grape sugar*, together with other products. To extract *A.* from bitter almonds, they are first crushed and submitted to pressure between hot iron plates. By this means the oil contained in the kernel (almond oil) is got rid of, and a solid cake remains. On digesting this cake with hot alcohol, the *A.* is dissolved out, and may be obtained by evaporating the alcoholic extract. *A.* is interesting on account of the curious decomposition which it suffers when dissolved in water and mixed with a small quantity of a substance called *emulsine* or *synaptase*, a body occurring along with it in the almonds. When such a mixture is allowed to remain for some time at a moderately warm temperature, the *A.* is wholly converted into oil of bitter almonds (benzoic aldehyde), hydrocyanic (prussic) acid, and glucose (grape sugar). The emulsine acts simply as a ferment. The change which takes place may be represented as follows:—



Amygdaline.	Water.	Oil of bitter almonds.	Prussic acid.	Grape sugar.
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Amygdaloid (Gr. *amygdalus*, an almond) is the name applied to rocks, always of volcanic origin, which contain oval-shaped spaces filled up with some crystalline mineral, such as agate, chalcedony, calcspar. These spaces seem to have been formed by bubbles of gas when the rock was in a molten condition.

Am'yl is the name of a *compound radical* or group of elements which can be transferred from one compound to another, and has the formula C_5H_{11} . It only exists in compounds, such as *A.* alcohol (the principal constituent of fusel oil), $\text{C}_5\text{H}_{11}(\text{OH})$; acetate of *A.* (oil of jargonelle pear), $\text{C}_5\text{H}_{11}(\text{C}_2\text{H}_3\text{O}_2)$; nitrite of *A.*, $\text{C}_5\text{H}_{11}(\text{NO}_2)$, &c. When attempts are made to isolate it, like others of its class, it becomes doubled, and forms a body called di-amyl or decane, $\text{C}_{10}\text{H}_{22}$.

Am'yloid Degeneration. The tissues of the body are liable to undergo various degenerations, the chief of which are the fatty, the calcareous, and the *A.* This kind of degeneration presents two varieties: (1.) In the brain, prostate gland, and other organs, small bodies are found presenting a striking resemblance to starch corpuscles, giving a distinct blue colour with iodine. These bodies are called *corpora amylacea*. In these cases the starchy or *A.* matter lies between the elements of the tissues, but in the next variety (2) the tissues themselves become changed into *A.* matter. This latter form is seen chiefly in the smaller arteries, the middle coats of which become thickened and translucent. With iodine this kind of *A. D.* gives a yellowish-red colour, but the cautious addition of dilute sulphuric acid after the iodine produces a blue tint. *A.* matter is nearly related to albumen. Its presence in the body produces symptoms varying according to the organ attacked. In some cases, it is the liver, in others the kidneys; in a third class it is the vessels which are involved. It is an incurable condition. Life may be prolonged, but by no known resources of the medical art can the *A.* matter already formed be removed, nor can the formation of more be prevented.

Am'yot, or Amiot, Jacques, a French scholar and man of letters, was born at Melun, 30th October 1513, studied at the Collège de France, where he was noted alike for his poverty and his learning; afterwards became Professor of Latin and Greek in the same institution, was made Abbé of Bellocane by Francis I., Bishop of Auxerre in the reign of Charles IX., and died 6th February 1593. *A.* is deservedly celebrated for his translations from the classics, of which incomparably the most important is his version of Plutarch. Others are *Sept Livres des Histoires de Diodore Sicilien* (Paris, 1554), *Histoire Ethiopique d'Heliodorus* (Paris, 1545), and *Amours Pastorales de Daphnis et Chloe* (Paris, 1559).

Amyridaceæ, an order of Dicotyledonous trees and shrubs found in tropical countries. They abound in a resinous juice, which, from its fragrance, is of great importance. Several kinds of Frankincense, Myrrh, Elemi, Bdellium, Tacamahac, and Balm of Gilead (q. v.), besides various other balsams and resins, are obtained from plants in the order. *A.* embraces 27 genera and upwards of 50 species, but very little is yet known of many of them.

Ana, added to the names of persons, denotes a collection of their memorable sayings, as *Scaligerana*. There are many such works, as *Walpoliana*, *Johnsoniana*, &c. Such titles originated in France. *A.* is often used alone as a noun, and means *anecdotes*.

Anabaptists, a name that has a distinct historical application, but which literally denotes those who 'baptize again,' i.e., who reject infant baptism as unscriptural, and require all new adherents coming from other denominations to submit to the rite a second time. In Britain and the United States, the designation applied to such Christians is Baptists (q. v.), who repudiate, however, all connection with the *A.* of the Continent.

One of the least happy effects of the German Reformation was to kindle visionary and fantastic ideas in weak minds. A notable instance of this was Thomas Münzer (q. v.), who may be considered the originator of the Anabaptist sect—at least in Germany. At first an orthodox preacher of the Reformation, he began about 1520 to plunge into a wild and irrational mysticism. His opinions gained for a time a footing in Switzerland, where, however, the disorderly fanaticism of his followers was such that the reformers were forced to persecute the new sect. Zwingli took no part in the severities inflicted on the *A.*, but it would scarcely be possible to blame him if he had. Men who despise human law when it conflicts with their own inward excitement, which they call the 'Spirit of God,' who consider themselves bound to immediately substitute the 'kingdom of God' for the existing state of society, who believe in a community of goods, &c., are in reality rebels against civil order, and cannot be dealt with as mere speculative theorists. That the Swiss *A.* were fanatics of this sort is not disputed. Had they contented themselves with declaring that 'it was of no more avail to baptize a child than to baptize a cat,' no one could approve of their punishment any more than he could admire their language, but they went far beyond eccentricities of doctrine or diction, and were prepared, in the frenzy of an unintelligible faith, to turn the world upside down. Zürich and St Gall were the chief scenes of their temporary success (1522-26). But it was in Germany that the Anabaptist movement excited the greatest sensation, and caused the direst mischiefs. Münzer's language in his wanderings through the country, after he abandoned the cause of Luther, inflamed the peasantry, who had been in a political ferment for years past. Four or five insurrections had already broken out since the beginning of the 16th c. The Reformation itself had increased the agitation, and now Münzer threw gunpowder on the burning coals, and the explosion forthwith took place. The 'Peasant War' (q. v.) is part of German history. It is only necessary here to state that the violence of the *A.* precipitated it in the S. W. of Germany, while in Thuringia it was personally carried on under the leadership of Münzer himself. The atrocities that marked both the beginning and the end of the insurrection were something horrible; nor did they cease with the capture and execution (1525) of the arch-rebel and heretic. Crushed in Saxony and Franconia, it spread through Westphalia, Holstein, the Netherlands. Itinerant preachers everywhere kept alive the flame of fanaticism in ignorant breasts. We may note particularly Melchior Hoffman, a furrier by trade, who appeared in Kiel in 1527, and in Emden in 1528. He made a bishop out of a

Haarlem baker named John Matthiesen, whose disciples established themselves in Münster, and by the help of violent partisans, obtained the control of the city, which soon after became a rendezvous for all the turbulent and sanguinary chiefs of the new movement—the burghers Knipperdolling and Krecthing; the Leyden tailor, Bockhold; Kippenbrock, the Amsterdam book-binder; and Matthiesen himself. When Matthiesen was slain during the siege of the city by the Bishop of Münster, Bockhold and Knipperdolling became the front or head of the anarchy. The churches were destroyed, Münster was transformed into a 'New Sion,' or 'New Jerusalem'; Bockhold became its 'king' (1534), and the prophecy began to be fulfilled that the 'saints' shall govern the earth. The result was a moral delirium that passed into a fierce licentiousness, which was only ended by the capture of the city (1535) and the execution of the leaders.

But the A. were not exterminated. With the fall of Münster and the disappearance of the half-crazed fanatics who had brought disgrace and disaster on the sect, a new era began. Some of Bockhold's disciples abandoned, or perhaps never entertained the mystical monstrosities of their master, and in Holland and the Low Countries of Germany communities of A. were gradually established who had nothing in common with the wild followers of Münster. The man who was most instrumental in bringing about this wholesome change was Menno Simons (see MENNO), who sought to build his system on a basis of Scripture, and who may be considered the founder of the Continental Baptists. His principles are set forth in his *Fundamentbuche von dem rechten Christlichen Glauben* ('Principles of the True Christian Faith,' 1556); and the *Taufgesinnte* (Dut. *Doopsgezinden*), or Baptist communities, of Germany and the Netherlands at the present day, regard Menno's book as authoritative on points of doctrine and worship. For an account of the history, opinions, and present condition of the sect, see the general article BAPTISTS.

Anabas, a genus of fishes included in the order *Teleostei*, allied to the mullets, and forming the type of the family *Anabotidae*. The most celebrated species of this genus is the 'Climbing Perch of India' (*A. scandens*), which derives its name from its habits of leaving the water, and of moving about on land; whilst it has also, but without verification, been supposed to climb trees. It possesses a peculiar arrangement of the head-bones for retaining a supply of water to moisten the gills.



Anabas scandens.

Anabasis (Gr. 'ascent'—i. e., from a lower country to a higher). Two Greek works have this title: (1) The A. of Xenophon, a narrative of the expedition of the younger Cyrus against his brother Artaxerxes, and of the retreat of the 10,000 Greeks from the plain of Mesopotamia through the highlands of Armenia to the shores of the Black Sea; and (2) the A. of Arrian, narrating the campaigns of Alexander the Great.

Anableps (Gr. *anablepō*, to look upwards). This group of fishes belongs to the order *Teleostei*, and forms a nearly-allied division to the well-known *Cyprinidae* or carps. The representative species is the *A. tetraphthalmus*, or 'four-eyed loach,' of the rivers and fresh waters of Guiana. It derives its popular name from the peculiar appearance of the eyes, the cornea and iris of each being divided into four portions by cross-bands of the conjunctiva or outer membrane of the eye.

Anacardiaceæ, an order of Dicotyledonous trees and shrubs, natives of tropical countries. Between 300 and 400 species are included in the order. Many of them abound in a resinous, or milky, poisonous juice, used as varnishes, &c., such as black Japan lacquer, Mastiche or Mastic, Sylhet, Martaban, and Chian turpentine. Their fruit, however, is often edible, as the Mango, Hog-Plum; and Cashew-Apple (q. v.) *Rhus*, including the different species of Sumach (q. v.), belongs to the order.

Anacardium, a genus of plants belonging to the order *Anacardiaceæ*. See CASHEW-NUT.

Anach'aris, an aquatic plant called *A. canadensis*, belonging to the natural order *Hydrocharidaceæ*. Although a native of America, it is now common in many parts of Britain. It was detected for the first time in Ireland in 1836, and in Scotland in 1842. How it was introduced is not known. It is of remarkably rapid growth, and has interfered much with navigation in some rivers and canals, such as in the Cam and Trent, and the canal near Edinburgh. Its stems are very brittle, and when broken into pieces, each piece takes root, and becomes independent. The plant is dioecious, and only the male form has been observed in Britain. Water-fowl, especially swans, are fond of it as food.



Anacharis.

Anacharsis, a philosophic Scythian who flourished in the 6th c. B.C. Love of travel brought him to Athens, where he arrived, it is said, just when Solon was giving the city a new code. With the great legislator he became very intimate, though he does not appear to have been much impressed with his practical ability as a statesman. The fame of his visit lasted down to later ages, and Diogenes Laertius, Plutarch, Athenæus, and Lucian have preserved many of the subtle sayings attributed to him. He is said to have been killed on his return, from a fear that he might attempt to introduce the Greek mysteries into Scythia. The nine letters attributed to him are not authentic. The book known as *Voyage du Jeune Anacharsis en Grèce*, written by Jean Jacques Barthélemy, though deformed by anachronisms, exhibits scholarship and taste. It has been translated into English, and has attained well-merited popularity. Without doubt, it gave Becker the idea of both his *Gallus* and his *Charicles*.

Anachronism (Gr. *ana*, upwards, and *chronos*, time), literally an error in chronology, by which an event is spoken of as taking place earlier than it did; but the distinctive peculiarity of an A. does not consist in a mere error of date, but in the transference of particulars from an age to which they belong to another in which they could have no place, so that in reality the event or circumstance is not only spoken of as taking place earlier than it did, but earlier than it could have done. Thus Chaucer, in his *Knights Tale*, represents Theseus, the Greek hero of antiquity, as a mediæval duke, who conquers the Amazons by his 'chevalrye,' whose courtiers keep the 'May,' who holds 'tournaments,' who invokes the saints of a church which was not yet in existence, and whose knights have 'Prussian' shields, and other wondrous impossibilities in the way of armour. The whole literature of the middle ages swarms with anachronisms, the product partly of grotesque ignorance and partly of tasteless indifference.

Anacreon, a Greek lyric poet, a native of Teos, born about 560 B.C., and when still a youth emigrated with his family to Abdera, on the coast of Thrace. Thence he removed to Samos, where he enjoyed the patronage of Polycrates. In 521 B.C. he went to Athens, and there met with Simonides. He died B.C. 475, on a voyage from Abdera to his native isle, at the age of eighty-five, having been choked by a grape-stone. His poems, graceful and melodious, celebrate love and wine, but only a few of the lyrics bearing his name are genuine. Moore's English translation is well known. The best French translations are those by Madame Dacier et Longpierre, by MM. Gail, and by De Saint Victor et Veissier-Descombes. There are excellent editions of A. by Brunck (Strasb. 1786), Fischer (Leipzig. 1793), Boissonade (Paris, 1823), and Bérgek (Leipzig. 1834).

Ana'ylus, a genus of plants of the natural order *Compositæ*. See PELLITORY OF SPAIN.

Anadyomene ('emerging'), a name of Aphrodite, best known in connection with the painting of Apelles, in which the goddess is represented rising from the sea, and wringing her hair with her hands. The picture, for which Phryne is said to have sat, belonged to the Coans, from whom Augustus bought it for the remission of 100 talents of taxes.

Anæmia is a condition of the body characterised by deficiency of certain constituents of the blood. The coloured corpuscles, instead of being in the proportion of 130 to every 1000 parts, as in health, are reduced to 70 to 50 parts; the albuminous matter in the blood is also diminished. The blood may be said to be in a watery condition. The person has a pale, sallow countenance, with blanched lips and gums. There is great disturbance of the general health—indigestion, flatulence, constipation, languor, and debility. The thyroid gland in front of the larynx is often enlarged, a condition usually associated with prominence of the eyeballs. Not unfrequently there is oedema, or swelling of the ankles and legs. This condition is treated most successfully by the administration of salts of iron, nourishing food, and fresh air. A. sometimes occurs as a symptom of other diseases. Any disease which affects the formation of healthy blood will produce A.

Anæsthesia. By this term is meant total or partial loss of sensibility, or power of feeling. When any part of the body is touched, certain nerves are affected which are called sensory nerves. These nerves convey impressions to the brain, where there is the consciousness of the impression or sensation. Sensibility, therefore, depends on the anatomical and physiological integrity of the sensory nerves and of the brain. If the function of either be interfered with, there must be disturbance of sensibility. (1.) *The Nerve.* If the sensory nerve be subjected to excessive irritation, there is a feeling of pain. If, on the other hand, we lower the sensibility of the sensory nerve artificially, impressions may not be felt which in ordinary circumstances might be acutely painful. When a sensory nerve is divided, there is no feeling in the part which it supplies. (2.) *The Brain.* This organ receives the influence transmitted by the sensory nerve, and consciousness of the impression is the result. The impression, however, is not perceived by the mind as being in the brain, but is always referred to the extremity of the sensory nerve. For example, the prick of a pin in the toe is referred to that part, although the changes immediately antecedent to consciousness occur in the brain. It will now be evident that if the functions of that part of the brain in which consciousness occurs be interfered with, sensibility must be likewise affected. If unduly excitable, impressions will be felt as painful which are usually not so, while, on the other hand, the sensibility of the brain may be so lowered, or even destroyed, as to cause diminished consciousness, or total unconsciousness. It will now be seen that A. may depend on paralysis of the sensory nerves, or on some condition of the brain which renders it incapable of perceiving external impressions. Accordingly we find that A. may be local or general. It is local when the sensory nerve supplying the part is cut across, or when the sensibility of the nerve is destroyed by extreme cold, or by the actions of certain drugs. It is general when the brain is affected by disease, or is under the influence of such substances as chloroform or ether, which have the property of suspending for a time the functions of the brain. During profound sleep, when part of the brain is inactive, and in the paroxysms of the insane, when the mind is preoccupied by its own wild imaginations, there is a degree of A. which prevents the individual from perceiving impressions in other circumstances painful. A. may be the result of disease, or it may be artificially produced. In both cases it may be general or local, complete or partial.

From early times men have searched for drugs which could remove or prevent pain, more especially in surgical operations. Indian hemp, opium, mandragora, and essences of herbs believed to be sleep-producing have been employed. A. has also been effected by pressure on the nerves, and by pressure on the neck, so as to cause obstruction to the circulation of blood in the brain. In 1800 Sir Humphry Davy suggested the use of protoxide of nitrogen, or laughing-gas (N_2O). In 1828 Hickman used carbonic acid (CO_2), and between the years 1822 and 1834 various American physicians demonstrated the anæsthetic properties of sulphuric ether ($C_2H_5 \begin{smallmatrix} \text{O} \\ \text{O} \end{smallmatrix}$). Ether was first em-

ployed as an anæsthetic by Morton, a dentist in Boston, in 1846, to prevent pain during the extraction of a tooth. In the same year it was used in dentistry in England, and was first employed by Liston, an eminent surgeon in Edinburgh, in a case of amputation. In 1847, on the suggestion of Waldie, a chemist in Liverpool, Dr J. Y. Simpson, afterwards Sir J. Y. Simpson, Bart., investigated the action of chloroform ($CHCl_3$), and found it to be an efficient anæsthetic. He quickly introduced it into obstetrical practice, and, chiefly owing to his powerful advocacy, it soon came into general use in Europe and the colonies as an anæsthetic in surgical operations. Ether, however, has always been employed in America, and is asserted to be less dangerous than chloroform. Since that date numerous substances have been tested as anæsthetics, but none have been found so safe or expeditious as ether or chloroform. It cannot be asserted that either of these is perfectly safe. Death has occurred during the inhalation of both, but as chloroform tends to weaken the action of the heart, it is credited with a larger mortality than ether. At the same time, taking into account the enormous number of cases occurring daily throughout the world in which either ether or chloroform is employed, the percentage of deaths is so extremely small as to reduce the risk of inhalation of ether or chloroform from the hands of an experienced person to a minimum. During the last few years attempts have been made to revive the old practice of producing local A. by applications of melting ice or substances which rapidly evaporate, such as a spray of ether. These methods, however, have not come into general use, because they may be followed by severe inflammation or even sloughing of the part. For a description of the various anæsthetic substances see CHLOROFORM, ETHER, INDIAN HEMP, METHYLENE, OPIUM, &c.

Anagallis, a genus of small plants of the order *Primulaceæ*. See PIMPERNEL.

Anagni (anc. *Anagnia*), a town in Latium, Central Italy, overlooks the valley of the Sacco, 37 miles E.S.E. of Rome. It is the residence of many noble families; but it cannot now be styled 'the wealthy,' as it was in the days of Virgil. In ancient times it was the capital of the Hernicans, became a flourishing municipal town under the Roman empire, was made the see of a bishop as early as 487 A.D., and continued to be a city of importance throughout the middle ages. It was the birthplace of Popes Innocent III., Gregory IX., Alexander IV., and also of Boniface VIII., who here (1303) suffered a brutal attack from Schiatta Colonna, an emissary of Philippe IV. of France, from the effects of which he died in a few weeks. The chief building of A. is the cathedral, which contains beautiful frescoes and mosaic-work of the 13th c. Pop. 6200.

Anagram (Gr. *ana*, backwards, and *gramma*, a writing) originally and literally denoted a simple reversal of the letters of a word or words, as in the German *leben* = *nebel*; i.e., life is but a cloud or vapour; but has long been applied also to any rearrangement of such letters as may secure a new meaning; e.g., Pilate's question, *Quid est veritas?* ('What is truth?') suggested to the pious anagrammatist of the middle ages *Est vir qui adest* ('It is the man who stands before you'); again, the French phrase *Revolution Française* yields, when the letters are properly transposed, *Un Corse la finira* ('A Corsican will end it'), referring to Bonaparte, with the significant addition of *veto* (I forbid).

Anahuac, an Aztec word meaning *near the water*, is the name of the ancient states that formed the nucleus of what is now known as the Mexican empire, and, though first applied only to the lofty Mexican plateau, in which are to be found a considerable number of lakes, it afterwards was employed to designate a wider area, spreading southward between the Pacific and Atlantic. See Prescott's *History of the Conquest of Mexico*, vol. i. chap. i.

Anakim, a race of giants occupying the district about Kirjath-arba, in the S. of Palestine, at the time of the invasion of Canaan by the Israelites. The name is probably derived from Anak, the founder of the race, which seems to have been divided into three tribes named after the sons of Anak—Ahiman, Sesai, and Talmi. The Israelites under Joshua exterminated them all but a small remnant, who found a refuge among the Philistines.

Anakoluthon (wanting sequence), a grammatical term denoting the absence of logical sequence in a sentence, the construction of the latter part not corresponding with that of the former.

Anal Glands. These are follicles or pouches in the vicinity of the anus, which secrete a fluid or semi-solid matter, having usually a powerful and disagreeable odour peculiar to different species of animals. They are to be regarded as modifications of the sebaceous glands of the skin. See SKIN. A. G. are most abundant in rodents and carnivora. Nearly related in structure to A. G. are those found in certain animals in the neighbourhood of the genital organs. The beaver, for example, has glands in this region which secrete the castoreum of commerce. Musk is derived from similar glands in the musk deer. The secretion in these cases is most powerful during the exercise of the sexual functions. Other animals, such as the skunk, polecat, and badger, have glands near the tail which secrete a most offensive matter which they eject when excited, and which they use to defend themselves.

An'alogus, a term applied to any organ, structure, or part in a living being which corresponds in *use* or *function* with another part, independently of similarity or dissimilarity in *structure*. Analogy means identity in function, and is used in contradistinction to homology, which implies identity in structure. The wing of a bat, bird, and butterfly are thus analogous.

Anal'ogy, or the similarity of relations, originally referred to the determinate relations of mathematics, *e.g.*, A. between the ratio of a number to its multiple and the ratio of the sum of several numbers to the sum of their equi-multiples. Latterly A. was applied to inference based on similar though indeterminate relations, *e.g.*, A. between mother and child and Great Britain and her colonies. A. is now popularly applied to inference from one case to another which it resembles generally. Metaphor and illustration are A. in germ, but are often reasoned from as if complete, *e.g.*, 'To plady infers the human will is not free, because Christians are spoken of as 'stones builded up.' In logic A. is a probable inference where our knowledge of the compared cases, especially of their fundamental differences, is imperfect, the dependence of one property on another not being known, *e.g.*, inferences as to whether certain planets are inhabited, the conditions of life being possibly different from those on earth. Formal logic says a general conclusion, followed by a particular application, is involved in A., and gives three forms of syllogism, varying with the number of ascertained resemblances. A. has also been expressed as a rule of three, the inference being the fourth term. False A. is common in political discussion, *e.g.*, A. between heart or brain and metropolis, which begs all the questions of local government. In comparative biology A. means similarity or identity of function, similar functions being often performed by unlike organs. A. is also applied to the interpretation of Scripture, statutes, and other documents, on the assumption (true of infallible books) that the meaning is throughout consistent, and expressed in a similar manner. Great interest has attached to particular analogies, *e.g.*, Butler's A. between the moral contradictions of Nature and those of Revelation; Paley's A. between telescope lenses and the humours of the eye, the inference in the latter being that the eye was constructed by Intelligence.

Anal'ysis (chemical) has for its object the breaking up of a compound substance into its constituent elements (or into other and more simple compounds of these) with a view to the determination of its composition. A. is employed to solve two kinds of problems of constant occurrence to the chemist: (1) to discover of what elementary bodies a compound substance is formed; (2) to determine the quantities of these contained in 100 parts of the substance. The first of these problems is solved by the aid of *qualitative A.*, the second by that of *quantitative A.* To determine the qualitative composition of a substance, it is submitted to certain tests: if in the solid state, its behaviour when heated before the blowpipe often leads to the discovery of at least one of its constituents; if in a state of solution, application of *liquid tests* is resorted to. These consist of acids, alkalis, or salts, usually dissolved in water, which, when added to the solution to be examined, may occasion certain phenomena or reactions characteristic of some known sub-

stance or substances. To give an example of these methods: if a solid compound of lead be heated on charcoal before the blowpipe, metallic lead is produced, and may be easily recognised by its softness, and the black streak it leaves when rubbed on paper. If a salt of lead dissolved in water be mixed with a solution of chromate of potash, a beautiful yellow and highly characteristic compound, called chromate of lead, or chrome yellow, is *precipitated* as a powder. Sulphuric acid mixed with the lead solution causes a white precipitate of sulphate of lead; caustic potash solution also causes a white precipitate; and solution of ammonia throws down a white precipitate, which disappears on adding more of the ammonia. Any solution which behaved with the above reagents as described, might be safely said to contain the metal lead. There is another kind of qualitative A., called spectroscopic A., which during the last few years has been of immense service to science, and by means of which not only have several new elements been discovered, but even the composition of the Sun, Mars, and other heavenly bodies, has been investigated. It depends on certain properties of *light* which it would be impossible to discuss here, but will be found described in art. SPECTRUM ANALYSIS.

In *quantitative A.* the chemist seeks to separate the different elements contained in a given weight of the compound he is investigating, and to obtain them either isolated or in some known form of combination such that he can determine their amount.

Anal'ysis, in mathematics, was originally a method of solving geometrical questions by assuming, in the first place, that which was to be proved, and then reasoning backwards, as it were, until something was reached which was already known. It was therefore opposed to synthesis, which reasons directly from the known to the unknown.

Modern mathematicians, however, regard it as algebra in its widest sense. It represents known quantities by symbols, such as letters, and from the relations which these bear to one another deduces by further investigation other and required relations. Under A. may be grouped such subjects as series (finite and infinite), curves, differential and integral calculus, calculus of finite differences, calculus of variations, quaternions, &c.

Anam. See COCHIN-CHINA, the Anamese empire.

Anamir'ta, a genus of tropical plants in the order *Menispermaceae*. See COCCULUS INDICUS.

Ananas'sa, a genus of tropical plants belonging to the order *Bromeliaceae*. See PINE APPLE.

Anaphrodis'iacs are medicines generally believed to have the power of repressing the sexual feelings. Nauseants, such as tartar emetic and ipecacuanha; purgatives, such as jalap, calomel, and elaterium, large doses of camphor, hemlock, and tobacco, have properties of this kind. See APHRODISIACS.

Anap'nograph. This is an instrument invented by two French physicians, Berjeon and Kastus, for registering the amount of air drawn into the lungs in inspiration and expelled in expiration. The principle of the instrument is that the current of air moves a vertical valve made of aluminum, to the edge of which a light, vertical lever is attached, which follows accurately the movements of the valve. The end of the lever carries a pen which registers its movements on a slip of paper passed underneath it by means of clockwork. The paper is divided into squares of a size arbitrarily chosen, but representing so much air. The curve thus produced not only represents the amount of air in expiration and inspiration, as might be determined by a spirometer (see SPIROMETER), but it also indicates graphically the force of the respiratory movements.

An'archy (Gr. *a*, privative, and *arche*, government), the name given to that state of matters in a country where no government exists or exercises any authority, and opposing factions struggle for supremacy. It is of necessity a transition state, and often ends in despotism or tyranny; but in Mexico, and most of the Spanish republics of S. America, it has prolonged itself far beyond its usual duration, and seems as if it would become the chronic condition of society.

Anarrhichas. See WOLF-FISH.

Anas. See DUCK.

Anasar'ca. This term is the name given to the condition in which there is infiltration of watery or serous fluid in the meshes of the connective tissue throughout the body. It may be due to various causes, such as disease of the heart, or of the lungs, or of the liver, or of the kidneys, or of the lymphatics. It frequently follows scarlet fever in cases where, from premature exposure to cold, the kidneys have become affected. The primary cause in all cases is obstruction to the free circulation of the blood, and A. is therefore regarded by physicians not as a disease, but as a physical sign of disease in some important organ. The remedial measures are directed to removing, if possible, the cause of the obstruction, and to draining off the superabundant fluid from the textures by acting on the bowels with purgatives which cause watery stools, such as cream of tartar and jalap; and on the kidneys with diuretics, such as infusion of broom, along with acetate of potash, or sweet spirits of nitre.

Anastasi'us I., Emperor of the East, surnamed 'the Silent,' was born at Dyrrachium in 430 A.D. Of the earlier part of his life we know almost nothing. After the death of Zeno he was proclaimed emperor by the Senate, and was crowned 11th April 491, at the age of sixty-one. He owed his elevation to the widow of his predecessor, whom he accordingly married. In the eye of the Church he was undoubtedly a great heretic. He had embraced the errors of Eutychius and the Manichæans, and used his imperial authority to protect and encourage dissentients from the Catholic creed. The result was a rebellion of the orthodox party headed by Vitalian, who ravaged a great part of the empire, and ultimately forced A. to abandon his patronage of heresy. Yet A. was not without good qualities. If not orthodox, he was at least humane, and he did the state good service by suppressing the contests in the amphitheatre between men and wild beasts, by his extinction of the sale of offices, by his fortification of Constantinople, by restoring the lighthouse at Alexandria, and by useful works in various parts of the empire. He died 8th July 518, at the great age of eighty-eight.

Anastasius I., elected Pope in 398 A.D., reconciled the churches of Antioch and Rome, after a seventeen years' schism. Two epistles bearing his name are evidently spurious: the one, addressed to Nerenianus, of little mark; and the other instructing the German bishops, among other things, to prevent the Manichæans, who had been banished from Rome, from entering Germany. The first, however, was obviously written after the death of A., and the other earlier than his accession to the pontificate, and therefore would have been without authority. Some of the doctrines of Origen he pronounced heretical, for which he received the praise of Jerome. Councils sat at Carthage, Constantinople, Ephesus, and Toledo during his pontificate, though A. himself played no important part in any of them. He died 14th December 401 A.D. Other three popes took this name, none of whom, however, merit notice.

Anastasius I., elevated to the patriarchate of Constantinople, 730 A.D., by the Emperor Leo, on the faith that he should aid in the work of iconoclasm, or image-breaking. The Emperor Constantine Copronymus, whose displeasure he had incurred by following the party of Artabazus, put out his eyes in 743, and, by way of disgrace, marched him into the hippodrome mounted on an ass, with his head to the tail, but, singular to say, did not venture to depose him. He died in 753.

Anastasius, St., the apostle of the Hungarians, was a native of France, and was born in 954. His original name was Astric, and it was under this name that he entered the Benedictine monastery of St Boniface at Rouen. A. accompanied St Adalbert to Bohemia, and when the bishop was forced to leave by the hostility of the people, he withdrew along with him. Soon after he found an asylum at the court of Stephen, the first Christian prince of Hungary, who in the year 1000 placed him at the head of the Abbey of St Martin, and made him Bishop of Colozsa, from which time he dropped the name Astric, and took that of A. Stephen sent him to Rome to obtain from the Pope the title of King (he was hitherto only Duke) of Hungary. He brought back not only a royal crown for his master, but also a double cross, the symbol of saintly or apostolic merit. The whole of A.'s long life was devoted to the propagation of the Christian religion. He died 1044.

Anastat'ia, a genus of Cruciferous plants. See ROSE, OF JERICHO.

Anastomo'sis. When arteries or veins unite, they are said to anastomose or inosculate. If an artery be placed for a short distance, it is found to divide into branches. These branches again subdivide, or give off other branches, and so on until the vessels become so small as to be termed capillaries (from *capilla*, a hair). Sometimes A. may occur in large arteries, as those of the hand, or foot, or brain; but they are more frequent in smaller vessels. A. permits of a free communication between currents of blood, and thus promotes an equable distribution of that fluid. A knowledge of A. in the larger vessels is essential to the surgeon, because when he finds it necessary to apply a ligature to an artery supplying a limb, so as to arrest the flow of blood through an aneurismal tumour (see ANEURISM), he expects the circulation in the limb to be carried on by collateral branches, which anastomose above and below the point of ligature. He has therefore to apply the ligature at a point where great branches are not interfered with.

Anath'e'ma (Gr. something 'set up' or 'apart'), a votive offering, applied also to a sacrifice; and as animals *set apart* for sacrifice must suffer death, A. came to signify something doomed to eternal perdition. It is the strongest form of ecclesiastical curse, the person under A. having no further hope, as the ban is final. A sentence so serious can be pronounced only by a council, a pope, or with the concurrence of the provincial bishops and their metropolitan.

Anatolia (Gr. *Anatoli*, the East; Turkish; *Anadoli*), the modern name of the peninsula of Asia Minor, and of a province of Asiatic Turkey. The total length is about 700 miles, the greatest breadth 400 miles, the area about 208,000 sq. miles. It is bounded N. by the Black Sea, E. by Armenia and Mesopotamia, S. by the Levant, and W. by the Archipelago. The general appearance of the surface is that of a high plateau, supported on the N. and S. by mountain ranges parallel to the coasts. On the W., between the sea and the elevated interior, many fertile valleys open out on the Archipelago. The tableland contains numerous salt-water lakes, and is drained by rivers, the largest of which flow into the Black Sea and the Ægean. The W. coast is famed for its genial climate and luxuriant vegetation. The N. coast has also a fine, but more humid, climate, and possesses immense forests of beech, oak, ash, elm, &c. The interior has hot summers and cold winters; the S. coast is very warm. Among the vegetable productions are the olive, mulberry, tobacco, rice, numerous fruits, &c. The barren interior affords pasturage for large flocks of sheep and goats. Copper, lead, rock alum, and marble figure prominently among the minerals. The inhabitants are mainly Osmanli Turks, nomadic Turkomans and Kurds, Greeks, Armenians, and Jews. Total pop. is given in the official census (*Almanach de Gotha*, 1875) as 6,753,337.

A. is divided into nine *vilayets* or provinces: 1. Asiatic Constantinople; 2. Brusa; 3. Aidin; 4. Kastamuni; 5. Angora; 6. Konia; 7. Adana; 8. Trebizond; 9. Sivas.

Anat'omy is the science which treats of the form and structure of living beings. It is primarily divided into vegetable A., or the structure of the organs and tissues of plants; and animal A., or the structure of the organs and tissues of animals. The A. of animals, again, is further subdivided into comparative A., that branch of the science in which the bodies of various animals are dissected and compared, so as to educe general laws regarding their affinities with each other; and descriptive A., which studies minutely the situation, form, and relations of organs in a particular species of animal. Descriptive A. may be again subdivided into as many departments as there are species in the animal kingdom. Thus we have human A., or anthropotomy; and horse A., or hippotomy. Various other terms are used by anatomists, such as morphology, or the investigation of the laws of form and structure; physiological A., in which the structure of an organ is considered with reference to its function; embryology, or the gradual development of structure in the embryo; general A., or histology, which treats of the minute structure of the organs and tissues of the body, which can only be revealed by the microscope; and finally, pathological A., in which the form and structure of dis-

ceased parts are described. Comparative A. is of the highest importance to a knowledge of the science which treats of the laws of life, or biology; it is the foundation of the science of physiology, which investigates and describes the functions of tissues, organs, and of the body as a whole: and the department of human A. is intimately related to the art of healing in the three great departments, medicine, surgery, and obstetrics.

In a work like the present it is impossible to find space for even a general account of comparative or human A., but short descriptions of the various tissues and organs will be found under their several names, *e.g.*, Atlas, Aorta, Duodenum, Lung, Liver, Brain, Spleen, &c. In the same manner, a general account of the A. of various species of animals will be found under the name of the species, *e.g.*, Crustacea (Crabs), Insecta (Insects), Horse, Dog, Pig, &c.

Anatomy, History of. From the earliest times men must have had opportunities of inspecting the framework, organs, and cavities of the body when they slaughtered animals for food or for sacrifice, but centuries passed before exact anatomical knowledge was regarded as being important. The art of embalming, practised by many ancient nations, did not require more than a very superficial acquaintance with the great cavities of the body. The first Hippocrates, who flourished between the years 460-377 B.C., makes many allusions to anatomical details in his medical and surgical works, which show that he knew something of the bones forming the skeleton, but little regarding the soft parts. At this period no distinction was drawn between artery and vein, or tendon and nerve. The many distinguished disciples of the Hippocratic school had singularly confused notions of the A. of even so large an organ as the heart, proving that the art of dissection was not practised to any great extent. A. continued in this embryonic condition for many years; and the few facts known were derived from observations made on the bodies of the lower animals.

Aristotle (4th c. B.C.) was the first who cultivated A. in a systematic manner. There can be little doubt he dissected the bodies of many animals, compared the different organs and structures, and thus laid the foundation of the science of comparative A. and the classification of animal forms. The anatomical works of the philosopher of Stagira consist of fourteen books—namely, ten on the *History of Animals*, and four on the *Parts of Animals*. Aristotle corrected many of the errors of previous writers. He showed that two great vessels arise from the base of the heart. One of these he termed the *aorta*, which he traced into the abdominal cavity, carefully describing most of its branches. He noticed also the difference between the thickness of the coats of artery and vein. He still confounded nerves with tendons, and maintained that the nerves originated in the heart. Finding the veins filled with blood after death, he concluded that these vessels carried that fluid throughout the body. He appears to have known also about the general arrangements of the organs in the abdominal cavity.

Previous to 285 B.C. all anatomical knowledge was derived from dissections of animals. In this year, however, two physicians of Alexandria, named Herophilus and Erasistratus, first dissected the human body, and they may be regarded as the founders of human A. Time has not transmitted to us any of their works, but reference is made to them by Galen and others who flourished many years afterwards. These ancient physicians dissected the membranes and sinuses of the brain, and the junction of various of the latter in the occiput is still known as the *Torcular Herophili*. They made the important step of demonstrating that many of the nerves issued from the brain, showed the lacteal vessels in the mesentery (without, however, knowing their function), described the valves guarding the auriculo-ventricular orifices of the heart, and generally gave precision to many anatomical details. For nearly 300 years the discoveries of Herophilus and Erasistratus constituted the sum of anatomical knowledge; but about the year 50 B.C. a great anatomist and surgeon arose named Celsus. He devoted his attention chiefly to osteology, and described the bones, along with their foramina and articulations, with great care.

During the reign of Trajan, a Greek physician, Ruffus, made the important division of nerves into sensory and motor, and it appears he was the first who performed physiological experimentation on the living animal. He showed that compression

of the carotid artery or of pneumo-gastric nerves in the neck produced insensibility and loss of voice.

About the year 130 the celebrated anatomist Galen was born. He contributed much towards advancing A., not only by his own works, but by collecting all the knowledge acquired by previous writers. He first divided the vertebrae into cervical, dorsal, and lumbar, and generally improved on the osteological descriptions of his predecessors. He attempted to dissect and describe the muscles; and it is remarkable that many of the names given by Galen to muscles seventeen centuries ago are still retained. He made the important step in physiology of demonstrating that the arteries contained blood, not air, as had been hitherto supposed. He was also the first who asserted that the brain is the organ of the mind, and that the spinal marrow was connected with motion. His description of the brain was singularly precise, while he added much to an accurate knowledge of the pleural cavities, lungs, pericardium, heart, and the abdominal and generative organs.

For 1000 years from the time of Galen A. made no advances. This is to be attributed to two causes: (1) To the disruption of the Roman empire, and the consequent abandonment of scientific culture by the degenerate Romans themselves, while the barbarous nations were still too uncivilised to devote attention to such subjects; and (2) to the religious prejudices and scruples of the Arabian physicians, who were for a time the guardians of medicine. The Koran forbade its disciples to touch a corpse, far less to dissect a body.

About the beginning of the 13th c. Italy again became the home of science. The University of Bologna encouraged medicine and surgery, and soon the science of A. was assiduously cultivated. In 1315, Mondino, a professor of A. in Bologna, dissected two female subjects, and gave public demonstrations of the parts. About 1480, Achillini, a disciple of Mondino, among other less important discoveries, described the malleus and incus, two small bones in the middle ear, and demonstrated that the ankle was formed of seven bones. Many other celebrated anatomists were connected with the school of Bologna, notably Berenger, who dissected above 100 human bodies. Each of these added facts to the science.

During the 16th c. A. was cultivated in France, but chiefly by dissections of the lower animals. About 1514 a young Fleming arose, named Andrew Vesalius, who left his mark on A. He was professor of A. in the universities of Padua, Bologna, and Pisa successively, and he was the first to write a comprehensive treatise on human A. He was followed by Eustachius, who described the tube leading from the middle ear to the throat which still bears his name, the muscles which move the small bones of the middle ear, and the A. of the teeth. He also published a volume of *Anatomical Engravings*, which for many years was the only atlas of A.

The Italian school at this period also furnished Fallopius—who was professor at Pisa in 1548, and at Padua in 1551—Varolius, Aldrovandus, and Coiter. All of these contributed information which assisted in rearing the superstructure of A. Most of their discoveries were of minute relations or arrangements, and they also corrected many errors of their predecessors.

About this time (1530) Fabricius of Acquapendente made the discovery of valves in the veins of the extremities, which was to have an important influence on the demonstration of the circulation of the blood some years afterwards. Hitherto it had been supposed that the arteries conveyed to the body a kind of air or spirit, while the veins distributed the blood. It was also held that the blood of the right side of the heart mixed somehow with that of the left, or with the spirit which was stored up there. A Spaniard, Michael Servetus, first showed that the septum between the two sides of the heart was impervious, and he maintained that the blood must pass through the lungs before it can go from the right to the left cavities. This man, who held many views at that time deemed unorthodox, was publicly burned, along with his works, at Geneva in 1553, a martyr to the bigotry and intolerance of the time.

We now come to the great discovery of the circulation of the blood. In 1619, William Harvey, an Englishman, demonstrated the true course of the circulation. Combining the anatomical knowledge of Fabricius of Acquapendente, whose pupil he was, with the information obtained by a well-contrived series of experiments, he demonstrated that the blood passes out from the heart by the arteries, and returns to it by the veins. For many

years he had no actual demonstration of the capillaries or intermediate vessels between the terminations of the arteries and beginnings of the veins, but he lived to see them by means of the simple microscope. It is impossible to over-estimate the value of this discovery, which affects every department of medical and surgical practice.

In 1622, Asellius, professor of A. at Pavia, discovered the physiology of the lymphatic system. The lacteals filled with chyle after digestion were first seen in a dog in 1622, and in 1627 they were seen in the body of a felon who had taken a hearty meal before execution. In 1647, Pecquet demonstrated the course of the chyle into the blood. The distinction between lacteals and lymphatics, and the discovery of terminations of the latter in the venous system, were made by Jolyffe, an English anatomist, and Rudbeck, a Swede.

Since this period the efforts of anatomists have been directed towards the more minute study of textures and the structure of organs. These efforts were much assisted by the use of the simple microscope, which was first directed to the tissues of animals by Malpighi. He first saw the blood corpuscles and the capillaries, and he investigated the minute structure of many tissues. Certain bodies in the spleen and kidneys still bear his name.

The progress of A. was much assisted by the art of injection of vessels and ducts. Ruysch, professor of A. in the University of Amsterdam in 1665, carried this art nearer perfection than any of his predecessors, and by this method he investigated the vascular arrangements in almost every part of the body. From that date A. made rapid advances, and each great master added his quota of facts. Space will not allow us to enter upon details, which are given with great fullness in the *Encyclopædia Britannica*, vol. i. art. *Anatomy*.

In recent times, the chief advances have been in the knowledge of the minute structure of the tissues. This has been promoted in two ways: (1) By the use of the compound achromatic microscope; and (2) by employing chemical and physical methods of so hardening, cutting, staining, and mounting the various tissues as to render their structure clear and distinct when placed under the microscope.

Human descriptive A. may now be considered as almost completed. It is not probable that any new organ, muscle, or nerve has escaped detection, or that there are many errors in the descriptions of anatomical writers. There is still much to be done, on the other hand, in the field of minute structure, and every month adds to our stores of knowledge. Embryological A. is also rapidly advancing, but is far from approaching completion. Comparative A. is a boundless subject, and will no doubt continuously advance through many centuries. It is now correctly regarded as the basis of scientific zoological classification.

The preceding sketch of the history of A. clearly shows the important relation the science bears to physiology, and through it to pathology and the practice of the arts of medicine and surgery. A. is the foundation on which the whole superstructure is reared, and it is important to bear in mind that every anatomical fact has a physiological significance, and consequently a bearing on the detection and treatment of disease. This is the reason why anatomical knowledge is correctly regarded as the basis of medical studies. See **PHYSIOLOGY, MEDICINE, SURGERY, HISTORIES OF**.

Anatomy (in Law). Until the year 1832 there were no sufficient legal means of procuring dead bodies for anatomical dissection. This defect led to the horrible trade of the resurrectionist, and to murder for the value of the victim's body. The system culminated in the notorious case of Burke, who was tried and convicted of murder, mainly on the evidence of his associate Hare, before the Court of Justiciary in Edinburgh in 1828.

The Act 2 and 3 Will. IV. c. 75, empowers the Home Secretary for Great Britain, and the Chief Secretary for Ireland, to grant licences to practise A. to any duly qualified medical practitioner or student of A., on written application by him countersigned by two justices of the peace, and certified by them. Inspectors are appointed by the Act to inspect schools of A., and to make quarterly returns of bodies removed for dissection. A relative may object to dissection, even though the deceased had expressed a wish for it. No body is allowed to be

removed till forty-eight hours after death, nor till twenty-four hours after notice to the inspector or to some neighbouring medical man. A certificate of the cause of death must be given by the medical attendant, or by a medical man called in after death. Anatomists are not to receive a body without a certificate; which is to be entered in a book, to be produced to the inspector when required. Provisions are made for decent interment of the body. Persons infringing the statute are liable to three months' imprisonment, or to a fine not exceeding £50. The Act is generally believed to have worked well, and to have fulfilled its purpose.

Anaxagoras, a very eminent philosopher of the Ionic school, was born at Clazomenæ in Ionia, B.C. 500. Born to wealth, he was able to give his time wholly to study. When twenty years old, he went to Athens, where among his pupils were Pericles, Euripides, and Socrates. Accounts differ somewhat as to the nature of the persecution which drove him from Athens. It seems, however, to have been superstitious. He was condemned to death, but by the eloquence of Pericles the sentence was commuted into banishment for life. He retired to Lampsacus, on the Hellespont, where he died aged seventy-two. No entire work of A.'s has come down to us, but from the fragmentary evidence we have respecting his philosophy, it appears that while much of its details was absurd and extravagant, it was in the main that of a man of subtle intellect. He held that all matter existed originally as atoms, and that these atoms, infinitely numerous, had existed from eternity; that the visible universe was the result of the aggregation of these atoms, which aggregation is, by the agency of the 'Nous'—a self-potent and all-pervading spiritual being—the most pure and subtle essence of all that is. A.'s fragments have been collected and published by Schaubach (Leipzig, 1827), and by Schorn (Bonn, 1829).

Anaximander, the friend, pupil, and successor of Thales the founder of the Ionian school of philosophy, born at Miletus, B.C. 610, died B.C. 547. He is chiefly noted as a mathematician, and is said to have been the inventor of maps, also to have been the inventor of the gnomon, a style column for observing altitudes, or at least to have been the first who applied the gnomon to determine the obliquity of the ecliptic. Absurd as many of his philosophic and astronomical theories may seem to us, he seems, nevertheless, to have had glimmerings of light on questions which have engaged the attention of many of the best intellects of our own time. He did not believe in creation or in generation, in the correct sense of the word. He believed that the infinite atoms, or primary matter, drew together and shaped themselves in virtue of an innate power. See Ritter's *Geschichte der Ionisch. Philosophie* (Berlin, 1821), and Schleiermacher's *Über die Lehre des A.* (Berlin, 1811.)

Anaximenes, an Ionian philosopher, and friend of Thales and Anaximander, was born at Miletus, and flourished in the 6th c. B.C. The aim of all his speculation was to find a satisfactory theory of the origin of the universe on the basis of materialism. This he considered himself to have attained in the doctrine that air was the primordial, eternally-existing element, from which by compression all things are formed, even the human soul. In the system of A. there is no necessity for a Creator.

Anaximenes of Lampsacus, pupil of Zoilus and Diogenes the cynic, is said to have been one of the teachers of Alexander the Great, and to have accompanied him on his expedition to the East. A. wrote three histories—one of Philip of Macedonia, another of Alexander the Great, and a third of Greece from the dawn of the mythic period down to the age of Epaminondas. Only a few fragments of these works are now extant, which is the less to be regretted, as they did not bear a high reputation in antiquity.

Anbury, a disease in turnips, known also as 'finger-and-toe,' on account of its presence producing excrescences somewhat resembling these two features in the human system. The origin of A. is not settled among vegetable physiologists. It is maintained by some that the cause of the malady, which renders utterly worthless the bulbs, is an insect; on the other hand, it is contended that a taint in the seed is the cause of the insect's appearance in the warts. It is certain that in all roots affected with A.

an insect is found in one of the twisted and abnormal growths from the main body. A. eats out the life of the turnip, making it worthless for feeding. A. hundred years ago A. was more prevalent than it now is. Still in recent times it has proved very disastrous to farmers, and no specific has been found out to prevent its ravages. The disease affects the turnip generally between the interval of singling and hoeing. Its presence is indicated by a flaccidity and yellowness of the leaves. It is peculiar that it does not run along the drills, but displays itself in patches here and there over the field, the driest knolls being the chief scenes of its havoc. Clay lands are less liable to be affected than light, porous soils. The principal insects found in the warts are the winter turnip-gnat (*Trichocera hiemalis*) and rove-beetles—*Oxytelus sculpturatus* chiefly. Liming and liberal manuring are recommended to avert its dangers, but neither of these operations can be relied upon as an infallible preventive.

Anca'ster, a town of Catamarca, in the Argentine Republic, S. America, lies in a mountainous region 23 miles N.E. of Catamarca. Pop. (1863) 8000.

Ancelet, Jacques-Arsène-François-Polycarpe, a French dramatic author, born at Havre, 9th February 1794, was employed in the naval department of the government service till the revolution of 1830. From his youth, however, he had a passion for poetic literature, and was incessantly versifying; but the first of his works that saw the light was *Louis IX.* (1819), a tragedy so successful that it ran for fifty nights. Less successful was the *Maire du Palais*, performed in 1823. His *Fiesque*, an adaptation of one of Schiller's pieces, was produced in 1824; *Marie de Brabant*, an epic poem, in 1825; *Six Mois en Russie* in 1827, a melange of prose and verse; and *Elisabeth d'Angleterre* in 1829. A pension of 2000 francs, bestowed by the king in 1819, was lost at the revolution of July, and although he set himself courageously to support his family by his literary industry, it is certain that not a few of his later works aimed at popularity by exhibiting a doubtful morality. Among the scores of dramas, comedies, vaudevilles, produced between 1830 and 1840, may be mentioned *Madame du Barry*, *Léontine*, *Le Favori*, *Le Regent*, *Madame du Châtelet*, *La Comtesse d'Egmont*, *Hercule comme une Princesse*, *L'Espion*. In 1841 he was chosen by the French Academy to succeed Bonald. His *Épîtres Familiales*, published soon after, are remarkable for brilliant satire, epigrammatic point, and graceful simplicity of style. His last work was his *La Rue—Quincampoix*. A. died at Paris, 7th September 1854.

An'chor is an implement by which ships are temporarily retained in a particular spot. Before the introduction of iron anchors by the Greeks, the ancients used stones or crooked pieces of wood fastened to weights for this purpose; and at the present day such rude instruments are found among the Chinese, and even among our own fishermen. The A., as employed by most civilised and European nations, consists of the following parts: The *shank*, the vertical and supporting beam of the A.; the *ring*, at the upper extremity of the shank; the *stock*, the transverse bar just below the ring; the *arms*, at the lower extremity of the shank, and branching out nearly at right angles to the stock; the *palm* or *fluke*, the flatish portion at the end of each arm, the sharp extremity of which is called the *peak* or *bill*; and the *crown*, the lowest part of the A., at the very extremity of the shank.



Anchor.

The most stable and natural position of an A. is evidently when the stock lies along the ground, and therefore the arms nearly perpendicular to it. As it is desired that the one arm should be forced into the ground by the pressure of the A. itself, the position of the flukes must be such as to form the angle most favourable for this purpose.

As a rule, British ships-of-war carry four anchors—the 'best bower,' the 'small bower,' the 'sheet,' and the 'spare'—though sometimes they are provided with two smaller ones—the 'stream' and the 'kedgce.'

Within late years there have been many improvements in the

forms of anchors, but perhaps the greatest novelty was that introduced by Porter, and improved by Trotman. The greatest peculiarity of Porter's patent consists in having the arms pivoted on the shank, and not fixed immovably; and there is also a projecting portion on the convex part of each arm called the *toggle*. The exposed arm, therefore, lies along the upper side of the shank, and thus there is less danger of 'fouling' by the cable becoming entangled on this arm while the vessel is swinging in a tideway. Trotman's improvements consist chiefly in making the flukes of a more convenient shape, and other similar matters of detail. Formerly, in the manufacture of anchors, a circle of smiths formed round the heated metal, and dealt blows in succession with most ponderous sledge-hammers; but now the powerful steam-hammers invented by Nasmyth have aided the operations in a wonderful degree.

An'chorage, though sometimes applied to a ship's suite of anchors, or to anchor-ground, is properly a due levied upon the captain of a ship for permission to anchor in particular anchor-grounds. As a rule, this is not required of a ship driven into port through stress of weather.

An'chor-ground is a portion of the bed of the sea or of a river suitable for anchoring in. A good A. obviously depends upon the depth and the nature of the bottom, which, if rocky, would be liable to break the flukes.

An'chorites, a class of Christian hermits who began to appear in the 3d c. The Ascetics (q. v.) at first thought it sufficient, in order to attain to a higher standard of holiness, to withdraw from worldly business and amusements, to practise fasting and celibacy, and otherwise mortify the flesh. This, however, did not long satisfy those who aspired to the highest degree of holiness; they must withdraw from mankind altogether. A. (Gr. *anachoretēs*, from *anachōrōō*, to withdraw), then, were those who retired from the haunts of men altogether, to escape the contamination of the world, and to devote themselves to contemplation; some also, no doubt, being driven to this course by persecution. As distinguished from other classes of monks, A. were those who had no fixed place of abode, but passed the night, without any shelter, wherever they happened to be overtaken by the darkness. Many went without proper clothing, wore iron chains and rings on their body, and even maintained painful postures, e.g., standing on the top of a pillar (see *STYLITES*) for years. When several inhabited the same wilderness not far from each other, they were collectively called a *Lauia*. A. never were numerous in Europe, probably owing to the more rigorous climate, and they disappeared altogether before the advance of the monastic system.

An'chovy (*Engraulis Encrasicolus*), a genus of fishes included in the *Clupeida* or Herring family, and which occurs abundantly in the English Channel, on the French coasts, and in the Mediterranean. The fishing extends throughout May, June, and July—that period being the spawning season. This fish averages four or five inches in length. The head is pointed, the lower jaw being of short conformation. The scales are of large size. It is chiefly used for making condiments; the viscera being simply removed, and the fishes preserved and prepared in various ways.

Anchovy Pear, the name given to a slender, tall tree (*Grias cauliflora*), a native of Jamaica, belonging to the order *Barringtoniaceæ*. Its fruits, which are russet-brown drupes, are used for pickles, and resemble the mango in taste. It is cultivated in hothouses in Britain, principally for its fine foliage.

Anchu'sa, a genus of rough-foliated Boraginaceous plants. See *ALKANET*.

Anchylo'sis. See *ANKYLOSIS*.

Anco'lon, a French family of Metz, who took up their residence in Prussia after the Edict of Nantes was revoked, and several of whom attained to eminence.—**David A.**, son of a distinguished Protestant lawyer, was born at Metz, 17th March 1617, and after being compelled to withdraw from his country, became French Reformed pastor successively at Frankfort, Hainau, and Berlin, where he died 3d September 1692. He was the author of several theological works.—**Charles**, his son

born at Metz, July 28, 1659, died at Berlin, July 5, 1715, wrote a considerable number of politico-religious works, of which may be mentioned *L'Irrévocabilité de l'Édit de Nantes* (1690), and *Histoire de l'Établissement des Français Réfugiés dans les États de Brandebourg* (Berl. 1690).—Louis Frédéric, grandson of the latter, was pastor of the French congregation at Berlin, where he died in 1814.—Jean Pierre Frédéric, his son, may be considered rather a Prussian than a Frenchman, and attained distinction entirely in the Prussian service, though he commenced his career as the pastor of a French community. He was tutor to the Crown-Prince of Prussia, and rose, through the confidence both of the king and the people, to high offices of state, finally succeeding Count von Bernstorff (1831) as Minister of Foreign Affairs. He died April 19, 1837. His various writings, written both in French and German, bear on statesmanship, and recommend that progressive legislation that prevents collisions between governments and the popular will, and which was the distinguishing feature of his own policy. Though thrice married, he had no children, and in him an honourable family became extinct.

Ancona, a fortified seaport and capital of a province of the same name, Italy, stands on a headland of the Adriatic coast, 11 miles N. of Loreto. It has a beautiful situation, is the see of a bishop, and retains a considerable share of the commerce for which in former times it was famed. It is said to have been founded by Syracusan refugees, driven hither (about 380 B.C.) by the tyranny of the elder Dionysius. It is meanly constructed, but contains several fine buildings. The Cathedral of St Cyriac, built in the 10th c., has the oldest cupola in Italy. A. was an important Roman naval station, and possesses an ancient mole 2000 feet long, on which stands one of the grandest triumphal arches in the world, erected by the Emperor Trajan. The town was taken by the French in 1797, but afterwards (1802) restored to the Papal see. In 1832 the French again took possession of its citadel, which they held till the Austrians evacuated the Papal territories in 1837. Ten years later it took part in the revolt of the Roman States, was bombarded and occupied by the Austrian troops, surrendered to the Piedmontese in 1860, and has since become part of the Italian kingdom. In ancient times A. was celebrated for its purple dye. Its trade is now principally in the hands of Jews, and the chief exports are woollen and silk goods, oils, cordage, bacon, and fruits. Pop. (1872) 45,741, of whom some 6000 are Jews.

Ancre, Baron de Lussigny, Marshal d', originally Concino Concini, son of a Florentine senator, went to France in 1600 with Maria de Medici, wife of Henry IV., and in conjunction with his wife, Eleonora Dori, surnamed Galiga, the queen's *femme-de-chambre*, promoted discord between the royal pair. After Henry's death he became leading favourite of the queen-regent, and was made a marshal and prime minister in 1613. Becoming obnoxious to the court and to the populace, he was assassinated in the Louvre before midday of April 24th, 1617, Louis XIII. being privy to the plot. His exhumed body, after being suspended by the feet to a gibbet, was burned before the statue of Henry IV. His wife was subsequently burned as a witch, and her son, a boy of twelve, deprived of his vast property, was expelled from France.

Anous Marcins, according to the Roman legend, was fourth king of Rome, and grandson of Numa Pompilius, like whom he cultivated peace, and was devoted to the service of the gods. He reduced several Latin towns, and settled the inhabitants on the Aventine. In the opinion of Niebuhr, these formed the original *plebs*, while Mommsen thinks they merely swelled the numbers of a pre-existing *plebs*. He founded a colony at Ostia, built a fortress on the Janiculum, dug the 'Ditch' of the Quirites, and built the first prison at Rome. His death is assigned to the year 614 B.C.

Anda, a genus of Euphorbiaceous plants. The seeds of *A. brasiliensis* are known in Brazil as *Purga dos Paulistas*, and are used with the same effect as castor oil.

Andalusia, or **Andalucía**, a large district in the S. of Spain, comprising the two former provinces of Andalusia proper and Granada, and the eight modern provinces of Huelva, Seville, Cadiz, Cordova, Malaga, Jaen, Granada, and Almería. It is bounded on the N. by Estremadura and New Castile, on the

E. by Murcia, on the S. by the Mediterranean and the Atlantic, and on the W. by Portugal. Area, 27,200 sq. miles. Pop. (1870) 3,264,640. The surface of A. is very mountainous, with the exception of the basin of the Guadalquivir. The mountain range called the Sierra Morena runs along its N. portion, and the Sierra Nevada borders the coast from the E. boundary to Gibraltar. The Guadalquivir flows between these ranges into the Atlantic. A. was formerly famous as the 'granary' and 'garden' of Spain; and though at present agriculture is very backward, it is still one of the most fertile districts in the kingdom. The banks of the Guadalquivir are luxuriantly productive. Maize, wheat, olives, oranges, citron, sugar-cane, figs, batatas, cactus, aloe, &c., grow vigorously, and wine and oil are abundantly produced. It is also well supplied with minerals. Its horses and mules are of superior excellence, and the Sierra Morena produces wild cattle for the bull-fights at Madrid. The climate of the S. is the hottest in Europe, but N. of the Sierra Nevada it is more temperate. The principal towns of A. are Cadiz, Seville, Cordova, Jaen, Granada, and Malaga.

The name A. has been derived from an Arabic word signifying 'the region of evening,' like the *Hesperia* of the Greeks (see Gibbon, chap. li.), but more probably it was originally *Vandalitia*, 'the land of the Vandals,' who, after wasting Gaul, poured through the passes of the Pyrenees, and settled here early in the 5th c. The inhabitants may be considered a mixed race. At least the original Celtic element must have been greatly changed by the successive infusion of Carthaginian, Roman, Goth, Vandal, and Moorish blood. The modern Andalusians are among the most lively and imaginative people in Spain, and not deficient in industry when they have any motive for exertion. The patois or speech of the people is a dialect of Spanish coloured with Arabic terms.

A. is the *Tarshish* of the Bible, and was called *Bætica* by the Romans. Under first the Arabs, and afterwards the Moors, who founded splendid kingdoms here, arts and sciences, chivalry and commerce, greatly flourished. The four great Moorish capitals were Seville, Cordova, Jaen, and Granada. Seville and Cordova long retained their pre-eminence in literature and the fine arts.

Andamans, a small group of islands in the Bay of Bengal, forming the western extremity of the Indian Archipelago. They are covered with dense forests, and sparsely inhabited by a race of savages. An attempt by the British to colonise the A. (1793) was abandoned on account of the climate; and on the suppression of the Indian mutiny they were occupied as a penal settlement. During a visit of inspection to the prison of Port Blair in 1872, Lord Mayo (q. v.), Governor-General of India, was assassinated by one of the convicts.

Andante (Ital. 'going'), a musical term, denoting a slow, gentle movement. Andantino is a little less slow than A.

Andennes, a town in the province of Namur, Belgium, 2 miles S. of the Meuse. It is noted for the manufacture of paper, porcelain, and more especially of tobacco-pipes. Near A. are marble quarries, pipeclay beds, and lead, iron, and coal mines. Pop. 6458.

Andarab, or **Inderab**, a town in the new Afghan province of Turkestan, on the river A., to the N. of the Hindu Kush Mountains. It lies in the midst of orchards and vineyards, and is an important station for the commerce with India. Pop. 6500.

Andernach, a town in the district of Coblenz, Rhenish Prussia, situated where the Rhine flows through a beautiful defile, nearly 20 miles above Bonn. It is a town of high antiquity, having arisen on the site of a Roman camp (*Antoninarum*), and was a residence of the Merovingian kings. It is quaintly built, contains a fine church of the 13th c., and is still surrounded by ancient ramparts. Its trade is unimportant; but the millstones of A., quarried in the vicinity, are widely celebrated, as is also its *trass* or cement, made of pulverised volcanic tufa, and which is durable in water. Pop. (1871) 4479.

Andersen, Hans Christian, Danish poet, dramatist, novelist, and the most popular of all story-writers for children, born at Odense in Fünen Island, April 2, 1805, was the son of a shoemaker, but showing poetical talent at an early age, he was recommended to the patronage of the king, and educated by the state. In 1830-31 he published two volumes of poems, and the romances

Agnes and the Mermaid and the *Improvisatore* were the fruit of his tour through Southern Europe in 1833-34. Of his novels and dramas, *Only a Riddler* and *The Mulatto* are respectively the best; but he struck his richest vein in his *Picture-book without Pictures* (1840), a charming volume of fanciful sketches. Subsequently he produced an almost endless series of tales, &c., which continue to please the old and delight the young of all nations, and of which may be named *A Poet's Day-Dreams*, containing the exquisite story of *The Flax*, and the beautiful autobiographic sketch, *Under the Willow-Tree*; *The Ice-Maiden*; *The Danish Fairy Legends*, embracing the famous *Ugly Duckling*, *The Will-o'-the-Wisps are in Town*, and the *Dream of Little Suk*. His *Story of my Life*, a fascinating autobiography, was finished in 1846. A. has had many translators, and as many publishers in England. One of the best editions of his collected tales is that translated by Wehnert, and published by Bell & Daldy, London, 1869. A. died August 4, 1875. In 1877 appeared at Copenhagen *Breve til H. C. A.*, a valuable contribution to the poet's biography, containing letters to A. from all kinds of persons, kings, princes, authors, &c. His mother's letters are unsurpassed in their way.

Anderson, James, LL.D., a writer on agricultural and miscellaneous subjects, was born at Hermiston, in the county of Midlothian, in 1739. Succeeding his father, who was a farmer, in the management of the farm at a very early age, he soon manifested a superior intellect, and introduced many improvements in agricultural instruments. In 1783 he removed to Edinburgh for the education of his family, and soon showed no inconsiderable talent in literary work. His first production, a series of essays on planting, appeared while he was still engaged in farm business, in Ruddiman's *Weekly Magazine* for 1771. Among his later writings may be mentioned *An Account of the Present State of the Hebrides and Western Coast of Scotland*; being the *Substance of a Report to the Lords of the Treasury* (1785); a tract on *Fisheries* (1784); and the article *Monsoon* for the *Encyclopædia Britannica*. He also published a weekly magazine called the *Bee* (1791-94) in Edinburgh; and later, at London, conducted *Recreations in Agriculture* (1799-1802). The most valuable papers in the latter were by himself; and they are evidently the production of one whose talents and originality must place him among the foremost of the founders and developers of the true science of political economy. A. died at London in 1808.

Anderson, John, F.R.S., Professor of Natural Philosophy in Glasgow University, was born in 1726 in the parish of Roseneath, Dumbartonshire. As an author, he is best known by his *Institutes of Physics*, published in 1786. As a professor and lecturer, his success and popularity were very great, not only in the university, but also in connection with his *Antilogia* class, which met twice a week for the benefit of artisans and mechanics. A. died at Glasgow, January 13, 1796, and bequeathed all that he possessed for the founding of an educational institute in Glasgow for the use of the unacademic classes.

Andersonian University, originally intended to be made up of four colleges, was, however, from the inadequacy of the funds, opened in 1796 with only a single course of lectures on natural philosophy and chemistry by Dr Thomas Garnett. The success was great; and since then the university has been greatly enlarged, there being now seventeen professors. The funds have been considerably increased by donations from private individuals, both in Glasgow and elsewhere. The chair of music was endowed in 1866 by William Ewing of Glasgow; and in 1871 a donation of £5000 was given by Mr Freeland for the general purposes of the university. In 1870, James Young, Esq. of Kelly, presented £10,500 for the establishment of a chair on technical chemistry.

Andes, the great mountain range of S. America, extends in an unbroken chain from the small river Atrato in the N., near the Isthmus of Panama, to Patagonia in the S., and is even traceable in the islands forming the Fuegian Archipelago, as far as the rocks of Diego Ramirez, about 60 miles to the S.W. of Cape Horn. Like the Rocky Mountains in N. America, the A. run close along the W. coast, so that the rivers flowing into the Pacific are necessarily very short and rapid. The length of this chain, without making allowance for the windings, is about 4500 English miles, while the breadth varies between 40 and 350 miles. Towards the W. the A. generally present a

steep slope, the ridge being from 20 to 80 miles distant from the Pacific; while towards the E. they descend by gradual stages into the broad and fertile plains of Venezuela, Brasil, and La Plata. They constitute the great watershed of the S. American rivers; and when there is a double or triple chain, the western one is the true and only watershed, and accordingly the more eastern ridges are intersected by numerous deep, narrow gorges, through which the mountain torrents flow in their eastward career to the Atlantic.

In giving a more detailed account of the characters of this gigantic range, we shall adopt the ordinary division and nomenclature, referring each portion to the particular country in which it occurs. The figures are taken from Von Kloecken's *Handbuch der Erdkunde* (Berl. 1873).

The *Patagonian A.*, from lat. 56° S. to lat. 42° S., consist of a single range of moderate elevation, the highest peaks, Yanteles, Minchinadom, and Corcobado, being respectively 8199, 7792, and 7511 feet high. Though only as much S. of the equator as Central Europe is N., the snow-line is just 3000 feet above the sea-level, and glaciers abound in the precipitous clefts of the coast.

The *Chilian A.*, from lat. 42° S. to lat. 24° S., contain many lofty and volcanic mountains, among others, Aconcagua (22,422 feet), Tupungata (20,338 feet), and the curious, truncated, cone-shaped El Descabezado (13,821 feet), on the summit of which is a plain 6 miles in diameter. The snow-line rises from 8000 to 10,000 feet above the sea-level.

The *Peruvian A.*, from lat. 24° S. to lat. 6° S., consist in the S. of two chains, which are known as the E. and W. Cordilleras of Bolivia, and which enclose the magnificent plateau of Titicaca, at a height of 12,290 feet. Immediately to the N. of this, in Peru, we have, on a plain whose elevation is 8300 feet, the mountain group of Cuzco, which is said to be thrice as large as all Switzerland. Between the 10th and 11th parallels, the ranges meet and form the tableland of Pasco, which is situated at a height of 11,000 feet; and a little farther to the N. the chain divides into three, which again unite in the knot of Lona, about 5° S. lat. The snow-line rises from 15,000 to 18,000 feet; and accordingly the higher peaks—Sahama (22,763 feet), Gualatieri (21,946 feet), Chuquibambha (21,000 feet), Illimani (21,550 feet), Pomarape (21,688 feet), Sorata (20,733 feet), and Arequipa (19,704 feet)—are covered with perpetual snow.

The *A. of Ecuador*, from lat. 6° S. to lat. 2° N., a lofty and volcanic portion of the chain, consist for the most part of two parallel ranges, uniting at various spots, and forming the tablelands of Asuay, Quito, and Los Pastos, the first at an elevation of 15,520 feet. Of the lofty peaks in this portion of the range may be mentioned Chimborazo (21,068 feet), Cotopaxi (18,811 feet), Antisana (19,282 feet), Cayambe (19,535 feet), all of which are above the snow-line, which here rises to a height of 16,000 feet.

The *A. of the United States of Colombia*, formerly *New Granada*, from 2° to 8° N. lat., separate beyond the city of Almaguer into two chains, the eastern one of which again divides into two known as the Central and Eastern Cordilleras of New Granada, which contain between them several tablelands, the principal one being that of Santa Fé de Bogota. The Pic de Tolima (18,129 feet) is stated to be the only mountain in New Granada which is capped with perpetual snow.

The geological character of the A. is very little known, especially as regards the palæontological section and the Tertiary formations, which were not recognised as of any great importance in the time of Humboldt, to whom we are chiefly indebted for most of the knowledge we have on this subject. Of stratified rocks, gneiss is found scattered through the greater part of the range, often associated with granite and mica-slate, and containing large quantities of garnet. Next to porphyry, mica-slate is of the most frequent occurrence, containing in some places beds of granular limestone, which is sometimes of so fine a texture as to resemble the finest Carrara marble. Clay-slate occurs in considerable quantity in the Secondary formations of Santa Fé de Bogota and Peru. Quartz and gypsum are also plentiful. Red sandstone is found in vast quantity, attaining a thickness of 5000 feet near Quito; and it crops up over the greater part of the llanos of Venezuela, being, however, covered by beds of limestone and gypsum towards the E. Of Tertiary formations and Secondary formations later than the magnesian limestone nothing definite is as yet known. Of the unstratified

rocks, there are granite, porphyry, trachyte, and rocks of volcanic origin. Granite is never found at great heights, but constitutes the basis of the whole S. American continent. Porphyry is of most frequent occurrence, and gives to the mountains a variegated appearance. Trachyte is a hard rock, consisting of separate crystals of glassy felspar, usually with a mixture of hornblende and mica, imbedded in granular layers of glassy felspar, and occurs through Chili, Peru, and the United States of Colombia.

The whole chain, and especially in Ecuador, is extremely volcanic; but the different volcanoes do not show any great activity, due, it has been supposed, to their immense height. The most dreaded of the S. American volcanoes is Cotopaxi, near Quito, which has been known to send its flames to a height of 3000 feet above the crater, and to emit such a dense cloud of ashes and cinders as to render the use of lanterns necessary in some of the contiguous villages in broad daylight. Closely connected with, and often accompanying volcanic eruptions, are earthquakes, which are more frequent and destructive in the A. than in any other portion of the globe. Cities and villages have been destroyed in an hour, terrible ravines have been brought into existence, and curious natural bridges have been formed spanning precipitous gorges, all through and by the agency of earthquakes.

Minerals and metals are found in great quantity—the topaz, amethyst, ruby, and most of the other gems. Gold and silver are obtained in Chili, Peru, and the United States of Colombia; mercury in Quito; platinum in the United States of Colombia; copper chiefly in Chili, but also in Peru, where it is called *anta*, which is supposed to be the derivation of the name A.; and tin in Chili.

The A. act as much as a watershed to the clouds as to the rivers, since the air at the summits of the peaks is so rare as to be almost incapable of containing water vapour, at least in any perceptible quantity. Also, as the wind is usually eastern in the tropics, and western in the temperate zones, it follows that the western side of the chain, from the equator to about the 30th parallel, will be drier than the eastern side, and *vice versa* for latitudes below the 30th parallel. This must obviously produce a decided difference between the climates of two places, on the same degree of latitude, but on opposite sides of the range.

Another consideration which determines the climate of any locality, besides its latitude and its position on the leeward or windward side of the chain, is its elevation above the level of the sea. Thus Quito, though situated almost exactly on the equatorial line, has a most agreeably temperate climate; and such is the case with many cities and villages, plateaux and valleys, in somewhat similar circumstances. Thus it is that on the slopes of the equatorial A. the beauties of nature are displayed in their greatest profusion—the variegated and lively tints of the foliaceous shrubs peculiar to the tropical and sub-tropical regions contrasting finely with the more sombre hues of the flora characteristic of the temperate and alpine zones.

While travelling through the A., one is not so much struck with the lofty grandeur of the individual peaks—which, when viewed from the plain at their base, do not appear in nearly the same gigantic proportions that Mont Blanc does from the Vale of Chamouni—as with the valleys and passes, flanked in many cases by precipitous walls rising to a height of 4000 or 5000 feet. The passes are very characteristic, usually following the course of the mountain torrents; or, if that is impracticable, surmounting them by bridges, or cutting a path along the shoulder of the overhanging height. Their elevation is also a noticeable character, the pass of Antarrangra, in Peru, being 16,199 feet high, and thus higher than Mont Blanc by 389 feet. For particular and detailed information, the reader is referred to Humboldt's *Personal Narrative*; Temple's *Travels in Various Parts of Peru*; Pöppig's *Reise in Peru, Chili, und auf dem Amazonen-Strom*; and Mrs Somerville's *Physical Geography*.

And'ra, a genus of plants belonging to the order *Leguminosae*, natives of tropical America except *A. inermis*, which is the cabbage-tree or cabbage-bark tree of the W. Indies, the bark of which is anthelmintic.

And'ron, or **Handiron**, a kind of fire-dog, often richly ornamented, in use in mediæval times for burning wood, and still to be seen at the open hearths of some old mansion-houses.

Andkhuy, a town of Afghanistan, on the river Jihun, 70 miles W. of Balkh. It was taken from Bokhara in 1840 by Mohammed Khan, who left it in ruins. It rapidly recovered, however, and in 1863 contained nearly 2000 houses, and 3000 kibitkas or tents. Pop. some 15,000, chiefly Turkomans. A. was once capital of a khamate of the same name.

Andorra (Fr. *Andorre*), a small state, situated in a rugged valley in Catalonia, Spain, having the French department of Ariège on the N. It is enclosed on all sides by mountains, except where the Balira issues to join the Segre. It is about 20 miles by 24 at its greatest width, with an area of 154 sq. miles. The pop. has been estimated at from 4000 to 12,000. Cap. Andorra; pop. 2000. It was declared a neutral territory about 790 by Charlemagne, for services rendered to him against the Spanish Arabs. The government is vested in a council of twenty-four members, who elect a syndic, in whom the executive centres. Two *viguers*, or judges, are appointed, the one by France, and the other by the Bishop of Urgel, whose jurisdiction dates from 819 A.D. Of these *viguers*, the former must be a native of France, and with them is associated a civil judge, elected alternately by France and by the bishop. The resources of the district, agricultural and mineral, are great, but are not developed. Cattle-rearing is the chief occupation of the inhabitants. There is, however, a small export trade in wood, charcoal, iron ore, wool, and cheese; but the imports are confined to the strict necessities of life, for the Andorrans are determined foes of luxury, and are even opposed to all change, their manners and customs having remained unaltered since the time of Charlemagne.

Andover, a market town of Hampshire, situated on the river Anton, 13 miles N.W. of Winchester, and a station on the South-Western Railway. The original form of the name was *Andasfaran* ('the passage or ferry across the Ande'), but it was not a place of note before the Norman Conquest. A. received its first charter from King John. It has a handsome town hall, and a church in the Early English style. The chief occupations are malting, tanning, and the traffic in timber with Southampton. The Weyhill fair, held near A., grew out of a Michaelmas revel to be one of the most important fairs in England. It begins 10th October, and lasts a week. Pop. (1871) 5501.

Andover, a township of Massachusetts, U.S., on the Merrimac river, 21 miles N. of Boston. It was incorporated in 1646, and is famous as an educational centre. The Phillips Academy of A. was founded in 1778, and has a revenue of \$12,000; there are also, besides many schools, a celebrated theological seminary for the Congregational body, and the Abbott Female Academy. A. possesses considerable flannel, linen, and shoe-thread manufactures. Pop. (1870) 4873.

Andral, Gabriel, a distinguished French physician and medical writer, was born November 6, 1797, at Paris, where he became professor of pathology in 1830, and in 1839 succeeded Broussais in the chair of pathology and therapeutics. Three years later he became a member of the Institute; and, after a brilliant career, both as a physician and a lecturer, he died at Paris, February 5, 1851. His principal works are *Clinique Médicale* (1824-27, 2d ed. 1840, 5 vols.); *Précis d'Anatomie pathologique* (3 vols., 1829); *Cours de Pathologie interne* (1836, 2d ed. 1848); *Notes et Additions au Traité de l'Auscultation Médiate de Laennec* (1837); besides several papers before the Academy, especially a series of researches *Sur les Modifications de Proportions de quelques Principes du Sang* (1842).

André, Major John, an officer in the British service during the American War of Independence, who met the fate of a spy on being taken while engaged in the questionable work of such a functionary, was born in London 1751, and entered the army 1771. Joining the British forces in America, he was employed to treat with the unfaithful American general Arpold for the surrender of the fortress of West Point, with the magazine of the American army. A., in disguise, had had an interview with the traitor Arnold within the American lines, from which he was returning when he was arrested, and the plans of West Point and the papers referring to its proposed betrayal being found upon his person, he was condemned to death as a spy, and hanged accordingly at Tappan, in New York State, 2d February 1780.

And'res, Johann Valentin, a German Protestant divine

and philosopher, born near Tübingen, August 17, 1586, and died June 27, 1654, at Stuttgart, where he was court chaplain. The main tendency of the theology, science, and philosophy of the age was scholastic, and this he set himself strenuously to oppose. His wit and humour were not less remarkable than his learning. He has been credited by some with having restored at least, if not founded, the order of the Rosicrucians, and this opinion seems to derive some support from his own confession that he was the author of the *Chymische Hochzeit Christiani Rosenkreuzis* (1616). He was, however, an uncompromising assailant of anything approaching mysticism, and of nothing more than of Rosicrucianism itself. Herder has been his chief expounder. His best known works are his *Menippus s. Satyricorum Dialogorum Centuria* (1617), *Mythologia Christiana* (1619), and *Gastliche Kurzwelt* (1619). See Hossbach, *A. und sein Zeitalter* (1819).

Andrew's, a genus of dark-foliaged, split-fruited mosses, named in honour of Andrea, a Hanoverian naturalist. There are nine species found on rocks in Britain.

Andre'ossy, Antoine Francois, Comte d', the great-grandson of Francois Andreossy, who assisted Riquet in constructing the canal of Languedoc, was born at Castelnau, March 6, 1761. He entered the army in 1781, and after the French Revolution broke out, he rose rapidly, serving with great distinction under Napoleon as an artillery officer and military engineer. In 1799 he was appointed Minister of War, and after the treaty of Amiens he was ambassador at London, and subsequently at Vienna and Constantinople. In 1814 he communicated some valuable memoirs to the Institute at Paris on the subject of hydrostatics. A. was also possessed of considerable literary talent, and wrote, among other works, *L'Histoire Générale du Canal du Midi* (Paris, 1800); *Campagne sur le Mein et la Rednitz, &c.* (1802); *Voyage de l'Embouchure de la Mer Noire* (1818), with atlas; *Mémoire sur et qui concerne les Marchés Ouvrés* (Paris, 1826); and *Mémoires sur les Dépressions de la Surface du Globe* (Paris, 1826). A. died at Montauban, Sept. 10, 1828.

Andrew, a disciple and afterwards apostle of Christ, was, like his brother Simon Peter, a Galilean fisherman. Little is mentioned of him, and of his apostolic labours nothing. Eusebius assigns Scythia, Jerome Greece, and Nicephorus Thrace, as the scene of his labours. He is said to have suffered martyrdom at Patras in Achaia on a *crux decussata* (X). For a notice of the *Acta Andreae*, see APOCRYPHA.

Andrew, St. or The Thistle, a Scottish order of knighthood, named after the patron saint of Scotland, was founded by James V. in 1540, and consisted originally of the sovereign and twelve knights. On the death of James in 1542 the order was discontinued, but was renewed by James II. of Great Britain in 1687, when eight knights received the order. Queen Anne increased the number to twelve in 1703; and George IV. added four more in 1827.

The decorations worn by the knights consist of a collar of sixteen thistles interlaced with sprigs of rue, a gold medal, and a star, worn on the left shoulder, consisting of a St. A.'s cross of silver, in the centre of which is a thistle surrounded by the motto 'Nemo me impune lacessit,' and rays of silver. The knights have the letters K. T. placed after their names. For details, see *History of the Orders of Knighthood of the British Empire*, by Sir N. H. Nicolas.



St Andrew's Cross.

Andrew, St. The Russian Order of, founded by Peter the Great in 1698, and confined to persons of the highest ranks, has for its badge a cross of enamelled blue, with, among others, the Russian motto meaning 'For Religion and Loyalty' inscribed upon it.

Andrews, Lancelot, an English prelate, and a theologian of great erudition, born in London in 1555, and educated at Pembroke Hall, Cambridge, of which foundation he became a fellow 1576. Secretary Walsingham gave him several pieces of preferment, and in 1589 he was elevated to the mastership of his college. Queen Elizabeth made him one of her chaplains in ordinary, and Dean of Westminster; and King James appointed him

one of the ecclesiastical commissioners at the conference at Hampton Court, and he assisted in translating the first twelve books of the authorised version of the Old Testament. In 1605 he was promoted to the see of Chichester, translated to that of Ely in 1609, and made a privy councillor. In 1617 he attended the king to Scotland, to aid him in his attempts to induce the Scotch to substitute Episcopacy for Presbytery; next year he was translated from Ely to Winchester, where he died 27th March 1625. Singularly meek as a man, as a Churchman he had exalted views of ecclesiastical authority, though he abjured the Roman Catholic claim for the independence of ecclesiastical assemblies of the civil power, and wrote two replies to Cardinal Bellarmine in defence of his views.

Andrews, St., an ancient Scottish city, on St. A. bay, N. coast of Fife. According to Fordun (book ii. ch. 46, 47), it owes its origin to the Abbot Regulus, a Greek saint, who in the 4th c. was ordered by the angel of the Lord to carry the relics of the apostle into the N.W. corner of the 'earth,' and in consequence, after shipwreck on the coast, landed in the N. of Fife at a place then called Mucross, or 'Swine's Wood,' afterwards Kilrymont, and finally St. A. in honour of the saint. At an early period the see of a 'Scoto-Irish' bishop, and the establishment, in the time of Alexander I., of a priory of Canons Regular, of which the last prior was Regent Moray, gave increased importance to St. A. as an ecclesiastical centre. The cathedral, begun in 1162, and consecrated in 1318, was in 1559 wrecked by a mob. Of the first cathedral, completed in 1144, there still remains a square tower 108 feet high. The university, founded in 1411 by Bishop Wardlaw, consists of three colleges—St. Salvator (1456), St. Leonard's (1512), and St. Mary's, a theological institution founded by Cardinal Beaton (1537). The castle, associated inseparably with the fate of Beaton, has long been a ruin. St. A. may be regarded as the cradle of the Scottish Reformation, and here occurred the martyrdom of Patrick Hamilton (1528) and of George Wishart (1546). The modern town is celebrated for its educational institutions, the chief of which is Madras College, founded by Dr A. Bell, and is a favourite sea-bathing and golfing place. St. A. is a royal and parliamentary burgh, and unites with Easter and Wester Anstruther, Crail, Cupar, Kilrenny, and Pittenweem in sending a member to Parliament. Pop. (1871) 6316. See Lyon's *Hist. of St. A.* (1843).

Andria, a town in the province of Bari, S. Italy, so called from a number of caverns (*antra*) in its vicinity. It was besieged and burned in 1799 by the troops of the Parthenopean republic (q. v.) The grand Cathedral of A. was founded in 1046. The chief trade is in almonds, for which the plain of A. is famed. Pop. (1872) 34,030.

Andrieux, Francois Guillaume Jean Stanislas, a French dramatist, born at Strasbourg, 6th May 1750. He was originally an advocate, and held several high state appointments, but was removed from office (1802) by Bonaparte, and obliged to adopt literature as a profession. In 1814 he became a professor in the Collège de France, and was subsequently appointed perpetual secretary to the Academy, in which capacity he greatly assisted in the production of the famous *Dictionnaire*. He produced numerous dramas, full of grace and spirit, the best of which are *Molière avec ses Amis*, *Le Vieux Fat*, and the tragedy of *Brutus*. A. died in Paris, 10th May 1833. His *Œuvres Choies* were published in 1862.

Androgynous (Gr. *andr*, a man; *gune*, a woman), a term applied to those organisms which unite in themselves male and female organs of reproduction. This designation is thus synonymous with *hermaphrodite* and *monæcious*.

Andromache, daughter of Eteion, King of Cilician Thebes, and wife of Hector, by whom she had a son, Scamandrius. She is unquestionably the finest female creation in the *Iliad*. The parting between her and Hector, in the 6th book, is portrayed with an exquisitely simple pathos. On the fall of Troy she fell to the lot of Neoptolemus, the son of Achilles, to whom she bore three sons. She afterwards became the wife of Helenus, the brother of Hector, and had a son to him, named Cestrinus. Racine, in his *Andromaque*, represents her as faithful even to the memory of Hector, thus ignoring the post-Homeric legend.

Andromeda, daughter of Cepheus and Cassiopeia, King and Queen of Ethiopia. The latter having boasted that A. excelled the Nereids in beauty, these prevailed on Neptune to

inundate the country, and to send a dreadful sea-monster to destroy men and cattle. When the oracle of Ammon declared that the wrath of the monster could be appeased only by the sacrifice of A., Cepheus chained her to a rock, where she was found by Perseus, who slew the monster, unchained A., and made her his wife. Minerva placed her among the stars; hence Milton's phrase in *Il Penseroso*, the 'starr'd Ethiop queen.'

Androm'eda, a genus of plants belonging to the Heath order (*Ericaceæ*), and containing many species which are trees and shrubs. *A. polifolia* is the only species native in Britain. It grows in bogs, and possesses acrid, narcotic properties which prove fatal to sheep, as *A. Mariana* of the United States, and *A. ovalifolia* of Nepal, are to sheep and goats. The leaves of *A. fastigiata* are used as tea in some parts of India.

Andron'ous. Three Byzantine emperors were so named.—**A. I.**, the Byzantine Alcibiades, and the last of the Comneni who governed the Eastern Roman empire, was born in 1110, and was famous for his manly beauty, the vigour of his body, his dauntless spirit, and his dissolute conduct. The story of his chequered career, as told by Gibbon, reads like a wild romance, but is strictly true. In his youth, while following the retreat of the Byzantine army through Asia Minor, after the death of the Emperor Joannes, he was made prisoner by the Seljukide Turks. On his release he went to Constantinople, 'where,' says Gibbon, 'his virtues and his vices recommended him to the favour of his cousin; he shared the perils and pleasures of Manuel; and while the emperor lived in public incest with his niece Theodora, the affections of her sister Eudocia were seduced and enjoyed by A.' Manuel gave him the command of Cilicia, where A. first displayed his disposition to treachery, by entering into a correspondence with the King of Hungary and the Emperor of Germany. He was in consequence arrested, and imprisoned at Constantinople for twelve years. His escape is a succession of marvels; but at length he reached Kiev, the residence of Jaroslav, Grand Duke of Russia, whom he induced to unite with the Emperor Manuel in the invasion of Hungary, and distinguished himself at the siege of Zemplin. After several seductions, he fled with Theodora, widow of Baldwin, King of Jerusalem, first to Damascus, and finally settled among the Turks in Asia Minor. Theodora and her two children having been carried captive to Constantinople, A. implored and obtained the mercy of the emperor, but was ordered to Oenoe, in Pontus. In 1182, after the death of Manuel, he was summoned by the Patriarch and patricians of Constantinople to become first guardian and then colleague to the young Emperor Alexius. His administration of the provinces was wise and vigorous; but repeated instances of cruelty towards his personal enemies stirred the crowd against him, and he was, at the age of seventy-three, put to death with dreadful tortures, September 12, 1185.—**A. II.**, eldest son of Michael Paleologus, born 1260; ascended the throne 1283; driven from it in 1328 by his grandson, **A. III.**, who died in 1341.

Andronicus of Rhodes, a Peripatetic philosopher, at the head of that school in Rome about B.C. 58. None of his writings have been preserved; but to him we owe the preservation of many of Aristotle's works.

Andronicus Oyrreastes, so called from Cyrrha in Syria, his birthplace, built at Athens the octagonal marble 'Tower of the Winds,' so named from its entablature representing the winds in bas-relief. The building probably belongs to the period after Alexander the Great.

Androp'ogon, an extensive genus of grasses. See **LEMON-GRASS**.

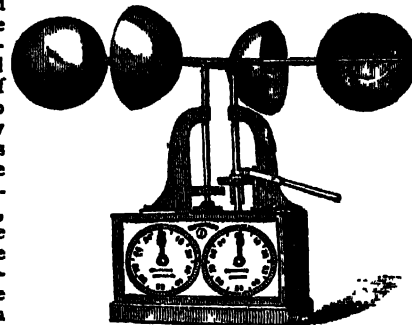
And'ros, the most northerly island of the Cyclades, in the Greek Archipelago, separated by Doro Channel, 6 miles broad, from the island of Eubœa (mod. Negropont). It is 21 miles long and 8 broad, and is mountainous, but very fertile, producing silk, wine, lemons, oranges, and pomegranates. Pop. about 16,000. The chief town, A. (pop. 5000), lies on the E. coast, and exports much silk. The island has had a chequered history, both in ancient and mediæval times. After the establishment of the Latin empire of Constantinople, it passed into the hands of the Venetian Dandolo, whose successors kept possession of it till 1566, when they were forced to surrender it to the Turks. See Hopf's *Geschichte der Insel A. und ihrer Beherrscher in dem Zeiträume von 1207–1577* (Vien. 1855).

Andu'jar, a town in the province of Jaen, in Andalusia, 104

Spain, lies on the Guadalquivir, at the foot of the Sierra Morena. It is unhealthily situated, the inhabitants are chiefly employed in agriculture, and the town is famed for its delf-ware. The convention of Baylen was signed at A., and also the decree of the Duc d'Angoulême in 1823, when he assumed for the French authority over Spain. Pop. 12,650.

Anegad'a, an island of coral formation, girt with dangerous reefs, lies furthest N. of the Lesser Antilles, about 19° N. lat., and between 64° and 65° W. long. It is known as 'the drowned island,' from its flat, desert appearance. Its sparse population is chiefly supported by numerous wrecks which occur on the coast. It belongs to England. Area, 13 sq. miles; pop. about 200.

Anemom'eter (Gr. *anemos*, the wind, and *metron*, a measure) is an instrument intended to measure the force or velocity of the wind, and is very important in the science of meteorology. It may be constructed



Anemometer.

either to measure the force or pressure of the wind upon a surface of given area, or to give the velocity of aerial currents directly. To the former type belongs Lind's A., which shows the pressure of the wind by the difference of level of the two surfaces of a liquid placed in a siphon-shaped tube, which has one of its legs (which point upwards) bent horizontally, so as to permit the wind to enter. The mouth of the tube is kept pointing in the direction of the wind by means of a vane. The instrument invented by Osler measures the force by its effect upon a brass plate of given area. When the plate is pressed back, a pencil, in the observing-room below it, is pushed forward to a proportional amount by means of a combination of springs. This pencil impresses a mark upon a sheet of paper, which is slowly moved along with uniform velocity by means of clockwork, so that the force of the wind at any time is represented by the ordinate of that part of the curve traced by the pencil, which corresponds to that particular time. Another pencil in connection with the vane records the *direction* of the wind; and a third pencil, connected with a rain-gauge, registers the quantity of rain which has fallen.

The anemometers of Whewell, Robinson, Casella, and Gordon measure the velocity of the wind directly by means of fans or hemispherical cups, fixed in such a manner upon horizontal rods that the rate of rotation round a central vertical axis is proportional to the velocity. Upon the axis is an endless screw, which communicates the rotary motion to index-wheels.

Anemone, a genus of plants of the order *Ranunculaceæ*, or Buttercup family. There are numerous species, chiefly found in temperate climates. Many of them are grown in gardens for their handsome flowers. By cultivation their stamens are often changed into petals.

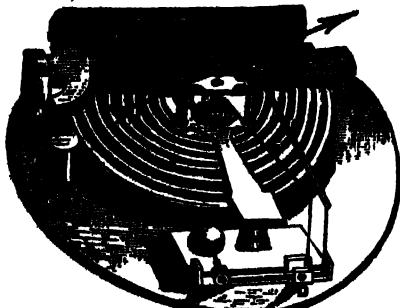
A. nemorosa is the common wood A. or wild-flower of Britain; *A. pulsatilla*, the pasque-flower, found in England. *A. ranunculoides* has yellow flowers, while those of *A. Apennina* are blue; both are naturalised in some parts of Britain. These species, along with the more showy *A. Japonica*, Japan A.; *A. hortensis*, star A.; and *A. coronaria*, poppy A., are commonly cultivated. *A. hepatica*, or *Hepatica triloba* of some authors, is one of the most ornamental early spring plants on rockwork, and in flower borders.



Anemone nemorosa.

Anemone, Sea, the name applied to the members of the family *Actiniada*, a group which forms the typical example of the class *Actinoda* of the Coelenterate sub-kingdom or type of animals. The name was doubtless first applied to these animals from a fancied resemblance they presented in their expanded state to certain groups of flowers; this idea being strengthened, no doubt, by the brilliancy of the hues and colours these forms present. They are very familiar inhabitants of all our rock pools, and are specially well adapted for an aquarium life. The body of each consists of a cylinder of soft flesh, with double walls. This body is attached by its lower extremity to the rocks, whilst the upper and free extremity bears the central mouth, surrounded by numerous arms or tentacles. These structures in the A. are present in multiples of five or six, and are of simple tubular conformation. They are hollow processes, perforated at their tips, and communicate internally with the body-cavity. The mouth leads into a stomach sac, which, as in all Actinoda, is of incomplete nature, in that it is open inferiorly, and communicates freely below, with the general cavity of the body. The stomach is retained in position by a series of vertical partitions which extend between the stomach and body-walls, these partitions receiving the name of *mesenteries*. Like the tentacles, they exist in multiples of five or six. When one of these animals is touched or irritated, it discharges the water contained in the interior of the body through the mouth and tips of the tentacles, and by retracting the latter within the body, converts the formerly expanded and flower-like structure into a conical mass of coloured flesh. From this retracted state it again evolves itself after a period of rest. As in all other Coelenterate animals, the tissues of sea-anemones are provided with little stinging cells, known as *thread-cells*, *cnidae*, or *nematocytes*. By aid of these cells, the prey upon which these animals feed, and which consists of crabs and other crustaceans, shellfish and other small animals of the sea-shore, is paralysed, or otherwise rendered helpless to struggle against its fate. These thread-cells may produce a stinging sensation if brought in contact with the soft mucous membrane of the human body, although they are apparently too feeble to pierce the ordinary skin. Although generally rooted, the anemones possess the power of moving about in a slow manner, through movements of the foot-like disc by which they are attached to rocks. The young are produced from eggs, and sometimes may be seen to escape in a fully-formed condition, but of small size, from the parent A.'s mouth. These animals may be cut or divided in various ways, with the result of artificially propagating them. Very many genera and species are known, and they are very generally distributed throughout the seas of the world. The *Actinia mesembryanthemum* is the most common species of all. The genera *Sagartia*, *Bunodes*, also include familiar forms. Mr Gosse's beautifully-illustrated work, *Actinologia Britannica*, or the *History of British Sea-Anemones*, will form a trustworthy guide to a further knowledge of these interesting forms.

Aneroid Barometer (Gr. *a*, privative; *nēros*, moist), invented by M. Vidi of Paris, consists essentially of a cylindrical box, about 3 inches diameter, in which a vacuum has been made, and



Aneroid Barometer.

A, vacuum box; B, metallic spring; C, lever; E, chain; F, arbour; G, spiral spring; H, index; J, adjusting screw. Atmospheric pressure change, the dimensions of the box, and therefore the position of the lever, are proportionately effected, and by a mechanical combination of levers and axes, this motion is transmitted, as one of rotation, to a hand moving in front of a dial, as in the common wheel barometer.

The A. D., besides being possessed of a great degree of sensi-

tiveness, has the advantage of being extremely handy for travelling purposes, since it is usually fitted in a small cylindrical box about five inches in diameter and two inches in depth. Before use, however, it should always be compared with a mercurial barometer, and set by means of a screw at the back.

Aneurism. An A. is a dilatation of one or more of the coats of an artery, producing a sac or bag, in which a clot forms. Such a tumour may interfere with the functions of neighbouring organs by pressure on important nerves or blood-vessels, and there is also the danger of hæmorrhage from rupture of the wall of the sac. In the event of hæmorrhage into a cavity of the body, such as the thorax or abdomen, death may suddenly take place. If, on the other hand, the A. ruptures externally, the individual may quickly bleed to death, or become exhausted by repeated hæmorrhages. An aneurismal tumour is recognised by the distinct pulsation it gives with each stroke of the heart, and by a peculiar blowing sound heard when the ear is placed over it.

Three forms of A. are usually described: (1) True A., in which all the coats of the artery dilate, and unite in forming the walls of the sac; (2) False A., in which the inner and middle coats of the artery are alone ruptured, and the wall of the sac is formed by the outer coat and adjacent tissues; and (3) Mixed A., in which the three coats having first dilated, the inner and middle ones subsequently rupture from distension. When the blood burrows between the middle and external coats, the A. is sometimes said to be dissecting.

Aneurismal tumours are usually caused by a sudden strain rupturing the inner coat, which has been previously weakened by degenerative changes. Hence they are more common in men than in women, and amongst those whose occupation exposes them to severe and sudden muscular exertion while the body is in a cramped position. Grooms, sailors, miners, hammermen at the forge, are specially liable to the disease.

The treatment of A. is both medical and surgical. The medical treatment is rest, remedies to lessen the force of the heart's impulse, and to favour complete solidification of the clot within the aneurismal sac. The remedy most relied on for the latter purpose is iodide of potassium, given in doses of from five to thirty grains three times a day. The surgical treatment consists of ligaturing the vessel above or below the A., compression by instruments, flexion of the limb, digital compression of the tumour, arrest of the flow of blood by acupressure, coagulation of blood within the sac by galvanic puncture, or by the injection of coagulating fluids. Regarding details as to these methods of treatment, reference may be made to surgical works, such as *Erichsen's Surgery*, vol. ii. p. 31.

Angiology is that part of anatomy which treats of the structure and distribution of blood-vessels.

Angel, a gold coin formerly in use in England, and ranging in value from 6s. 8d. to 10s. It derived its name from having on its obverse side a figure of the archangel Michael piercing the dragon. Angels were first coined in the 15th c., and continued to be coined till the period of the Commonwealth.

Angel Fish, or **Monk-Fish** (*Squatina angelus*), a genus of fishes included in the Shark order (*Elasmobranchii*), and forming the type of the family *Squatinida*. It gains its popular name from the expanded pectoral or ventral fins, which give to the body a hooded or winged appearance. The average length is five feet or more. It occurs around the British coasts, and in European seas generally. The head is broad and rounded. No anal fin exists, and two spiracles or breathing-pores exist on the top of the head. The skin is covered with small placoid scales. An allied species, *S. aculata*, occurs in the Mediterranean.

Angelica, a genus of Umbelliferous plants, natives principally of temperate regions. Some of the species were formerly regarded as possessing angelic virtues, hence the name. They were used as a remedy against poison, plague, infection, witchcraft, and enchantment. They are not now regarded for their virtues. *A. sylvestris* is a common species in Britain, found in damp woods, and even high on the mountains, and forms a picturesque feature to the landscape. The garden A. belongs to a different genus. See *ARCHANGELICA*.

Angelica-Tree, the English name for *Aralia spinosa*, sometimes also called toothache-tree. See *ARALIA*.

Angelo, Michael. See *BUONAROTTI*.

Angels (Gr. messengers), in the theology of Scripture, a race of spiritual creatures higher than men, who exist for the service of God in heaven and on earth. As they are only casually introduced in Jewish and Christian history, we cannot venture to form any complete theory of their nature and work. There is nothing in their recorded appearances requiring us to believe that there is any essential difference between their nature and that of human beings; but there is a popular notion that they constitute a distinct order of creatures, and that they possess attributes which will always separate them from men even in the spiritual world. The work which contains the most complete (though imaginative) exposition of the angelic system is the *Hierarchia Cælestis*, ascribed to Dionysius the Areopagite (q. v.), a composition probably belonging to the 6th c. Dionysius divides this hierarchy into nine orders: thrones, cherubim, seraphim, dominations, virtues, powers, principalities, archangels, and A. proper. Gregory the Great, and the Church generally, adopted his classification. Traces of such distinctions are visible in the writings of St Paul (Rom. viii. 38; Eph. i. 21, &c.), and are undoubtedly part of that rabbinical lore in which he was well trained, and which he did not feel called upon to reject when it did not conflict with his Christian faith. Canonical Scripture mentions only two A. by name, Michael and Gabriel; but in the Apocrypha we meet with Uriel, and in the writings of the Talmudists with many more.

As Scripture is silent regarding the origin of A., there has been nothing to check the licence of speculation, and early Christian literature is full of notions that rest on nothing. Some, as Gregory the Great, imagined that A. existed before the material universe, others that they had been created on some one of the six days—Augustine, *e.g.*, supposed on the first. Tertullian, Tatian, and indeed most of the Fathers, conceived them as possessing refined and ethereal bodies, a view subsequently endorsed by the Church at the second synod of Nice (787). The idea of *guardian A.*, which is still a half-belief in all Christian countries, was undoubtedly adopted by the Jews from their heathen neighbours—probably from the Greeks. No trace of it occurs in the old Hebrew Scriptures. Philo reduced it to a system. At an early date it passed over into the Christian Church. It is plainly stated in the *Shepherd of Hermas*, who assigns to man a good and a bad angel. Clemens Alexandrinus affirmed that cities and provinces were placed under the protection of A., which is certainly a reproduction of the Hellenic myth of a *genius loci*, or of the Latin myth of the *Lares publici*. This doctrine naturally led to the worship and invocation of A., which appears to have been in partial operation as early as the middle of the 4th c., for it was condemned about that period by the Council of Laodicea. St Ambrose distinctly recommended their invocation, Augustine, Theodoret, Gregory the Great, and others opposed it, but the practice of dedicating churches to A., which was favoured by bishops and emperors, confirmed the people in their belief that A. heard and answered prayer, and in spite of repeated explanations and qualifications, it may be considered part of the religious convictions of the Greek and Roman communions to the present hour.

Angermanland (pron. Ongermanland), a former division of N. Sweden, now chiefly comprised by the Län of Westernorrland (q. v.)

Angers (anc. *Andecavum*), the capital of the department of Maine-et-Loire, France, situated on the navigable river Mayenne, 161 miles S.W. of Paris. It is the see of a bishop, and possesses a grand cathedral of the 9th c. in the Roman basilica style. It was the seat of a university, founded 1246, which has recently given place to a superior academy. Lord Chatham and the Duke of Wellington studied for some time at A., and it was the birthplace of David, the sculptor. The chief employments are sail-making, cotton-spinning, and stocking-weaving; there is besides a considerable trade in corn, wine, brandy, hemp, and honey. There are extensive slate quarries in the vicinity. Pop. (1872) 51,525.

Anghis'ri (anc. *Castrum Angulare*), a town in the province of Arezzo, in Tuscany, N. Italy, near the Sovara, a branch of the Tiber. The Florentines gained a victory over the Milanese here in 1440. Pop. of commune, 6941.

Angina Pectoris is the name given to a severe paroxysmal, suffocative pain in the chest, in the region of the heart, accom-

panied by extreme anxiety and a foreboding of impending death. The pain usually shoots towards the left shoulder. It lasts for only a few minutes. Several attacks may occur, and at last the individual dies during a seizure. The affection is symptomatic of fatty disease of the wall of the heart, or of disease of the coats of the cardiac blood-vessels. Little can be done during the attack, except to apply warm poultices over the heart, and give internally diffusible stimulants, such as ammonia, ether, wine, and brandy. The inhalation of a few drops of nitrite of amyl often gives great relief.

Angioleucitis. This is a disease consisting of inflammation of the lymphatic vessels. The neighbouring lymphatic glands are usually also involved. A. is seen in the case of punctured dissection-wounds, from the absorption of some poison derived from decaying animal matter; in abscesses and carbuncles occurring in unhealthy persons, from absorption of foetid pus; and in erysipelatous inflammations. The symptoms are intense pain along the lymphatics, which are felt as hard cords under the skin, inflamed and painful glands, shivering, sickness, fever, debility, and mental depression. The inflammation may terminate in suppuration, or it may gradually disappear. In some cases, blood-poisoning may occur to such an extent as to cause death. The remedies are rest, application of hot fomentations or poultices to the part, nutritious food easily assimilated, such as beef-tea or soups, the moderate use of alcoholic stimulants to combat depression, and stimulant tonics, such as carbonate of ammonia along with Cinchona bark, given every three or four hours, in doses proportionate to age and the state of the patient.

Angiospermous, a term used in botany to those Dicotyledonous plants having their seeds in a seed vessel, while Gymnospermous is applied to those having seeds produced without a seed-vessel, as in pine-trees and cycads.

Angle (Lat. *angulus*, a corner) is the measure of the opening between lines or planes which meet. Suppose one of two lines, originally coincident, to rotate uniformly like a hand of a watch, the other being fixed. At the end of a quarter of a revolution the A. made by the two lines is a *right A.* An *acute A.* is less, and an *obtuse A.* greater, than a right A. A *dihedral A.* is formed by two planes, and is measured by the A. between those lines in the planes which are perpendicular to the line of intersection. A *solid A.* is formed by three or more non-coplanar lines meeting at a point.

Angle Berries. Unseemly and painful excrescences, like warts, upon cattle, chiefly developing themselves upon cows, and in the belly, groin, and teats. The easiest and surest way of removing them is to tie a piece of waxed silk thread round them, and tighten the thread every day until the tumour decays and falls off. In their early stages, applications of nitrate of silver, alum, or zinc sulphate in solution, will remove them.

Angler Fish, or Fishing-Frog (*Lophius piscatorius*). This Teleostean fish is included in the Acanthopteroan division of that order, and in the family *Lophiidae*. It is frequently cast up on our shores after storms, and is sometimes called the 'sea-devil,' or 'granny-fish.' It attracts attention by the enormous size of the head, and wide opening of the mouth, which is amply furnished with teeth. The head is broad and flat, the eyes being placed on its upper surface. The body is short, and the tail tapers. Two dorsal fins exist. The pectoral fins are well developed, the ventrals being situated below them. The scales are small, and sparsely scattered over the body. The gill-aperture is placed behind the pectoral fins, and is of small size, the gill-chamber itself being large. The front of the head bears two elongated filaments, which are said to be of use to the fish in capturing its prey. It thus buries itself in the mud, and by moving these filaments about, attracts the attention of smaller fishes, which unsuspectingly approach the concealed enemy, and are thus seized. From this practice, its name of A. has been derived.

Angles (Lat. *Angli*), according to Ptolemy, were a German tribe of the Sævic family who originally occupied part of the country on the E. side of the middle course of the Elbe. Tacitus classes them, along with other and obscurer German tribes, as worshippers of Nertha, or Mother Earth. That at a later period they pushed their way northward to the corner in Slesvig which still bears the name of Angeln, is possible, but

has no decisive evidence in its favour. Some adventurers may have done this, but it is probable that the flats of N. Germany were the chief abode of the tribe at the time of their invasion of Britain. Dr Latham does not believe that any real difference existed between A. and Saxons, and there is much to be said in favour of such a view. He thinks that while the Romans, Gauls, Franks, and Britons spoke of the invaders as Saxons, these knew themselves under the name of A. If this theory were adopted, it would satisfactorily account for the present name of the country, England, *i.e.*, *Engla-land*, land of the A., though the extent of British territory conquered and peopled by this particular tribe, *viz.*, the whole of the island from the Thames to the Firth of Forth, is itself a sufficient explanation of the circumstance.

Anglesea, Henry William Paget, Earl of Uxbridge and Marquis of A., a distinguished cavalry officer, born 17th May 1768. He was educated at Oxford, and at an early age held an important command in Flanders. He afterwards served in Spain, and during the retreat to Corunna, under General Moore, his services were of great value; but it was at Waterloo that he gained his highest distinction. There he commanded the British cavalry, and lost a leg. On his return he was created Marquis of A. In 1828 he was made Lord-Lieutenant of Ireland, an office to which he was appointed a second time in 1831; but in consequence of the coercive measures forced upon him by the agitation of O'Connell, he became exceedingly unpopular. He founded the Irish Board of Education. In 1846 he was appointed Master-General of the Ordnance and made a field marshal. A. died 29th April 1854.

Anglesey, or **Anglesea**, an island and county of N. Wales, in the Irish Sea, separated by the Menai Strait (q. v.) from the mainland, with which it has communication by means of the Menai Suspension Bridge and the Britannia Tubular Bridge (q. v.). It is somewhat triangular in shape, the surface is flat and bare, and agriculture has only of late years received much attention. The climate is milder than that of the mainland, but in autumn is frequently misty and unhealthy. A. is the only county of Wales that is not mountainous. It is about 20 miles long, 17 broad, and 80 in circumference. Area, 193,453 acres; pop. (1871) 51,040. In 1872 there were 33,750 acres under corn, and 11,164 under green crops. The rearing of cattle is a chief occupation, and on an average about 5000 are exported yearly. There are no important manufactures. A. is chiefly formed of mica schist, with occasional limestone ranges, the other rocks being granite, various marbles, coal, and serpentine. Its lead and copper mines, opened in 1768, were the richest in the kingdom till 1800, but have since declined. The chief towns are Amlwch, Beaumaris, and Holyhead (q. v.), which, with the village of Llangefni (pop. 1222), return one member to Parliament, the county returning another. A., called by the Britons *Mon*, a 'separate' district (comp. the Gr. *mon-os*, 'alone'), a name modified by the Romans into *Mona*, was the last stronghold of the Druids, still containing many dolmens, and other interesting Celtic remains. It was conquered by the Roman general Suetonius Paulinus in 61 A.D., by Agricola in 76, and again by Egbert in the 9th c., who gave it its present name A., *i.e.*, 'the Englishman's Isle'; but the native princes succeeded in recovering their land, making Aberffraw the seat of government. In the reign of Edward I., however, it was finally brought under English rule.

Anglican or **Anglo-Catholic Church** is a term the application of which varies. It is sometimes used to denote exclusively the Reformed Church of England; at other times, it is applied to that portion of the Church which has existed in the island ever since the introduction and establishment of Christianity. It is occasionally restricted to the Church of England at home, though it properly embraces her Indian and colonial branches; and it is even extended, but with less accuracy, to those 'communions which follow her doctrine, discipline, and worship, though not legally associated or connected with her. For a sketch of her history, and an outline of her doctrine, see ENGLAND, CHURCH OF.

Angling is the art of capturing fish by means of a rod, line, and hook, the hook being dressed or baited for the purpose. The literature of the art is in England as old as the 15th c. In 1496, Dame Juliana Barnes, prioress of the nunnery of Lopewell, wrote a tract entitled *The Treatyse of Fysshynge with an*

Angle. This work bears to be *Emprinted at Westmestre by Wynkin de Worde. The Complete Angler* of Izaak Walton was published in 1653.

In Scotland the salmon and the trout are, as a general rule, the only river-fish which give amusement to the angler, while pike, perch, and trout usually abound in the lakes. The rivers of the midland counties and S. of England again produce a much greater variety of fish for the exercise of the angler's art. They have roach, chub, dace, gudgeon, tench, pike, and grayling. The last has of recent years been successfully introduced into the Clyde in Scotland, in which country, we believe, all the above-mentioned fish are to be found, but they are not common. The eel is common in both countries, but in Scotland detested both by the angler and the cook. Of British fish, the salmon, the trout, the grayling, and the pike afford the best sport to the angler. To them, therefore, we limit the scope of this article, reserving for future articles any remarks we may have to make on the habits and mode of capturing the others.

No other fish affords such sport to the angler as the Salmon (q. v.) when 'clean'—that is, freshly run from the sea. The chief lure employed is what we call an artificial fly, which is, however, certainly neither like a fly nor any other object in nature. Why the fish seizes it is therefore inexplicable. Some anglers suppose that it does so from irritation; and certain it is that, unlike the trout, the salmon may be induced to seize the fly by perseveringly playing it before his eyes. There can be no doubt, either, of the curious fact that certain colours and combinations of colours are more effective than others, and that the salmon of one river differ in taste for these from the salmon of another, even though both are freshly run from the sea. The salmon-fisher, therefore, will do well always to consult the local tackle-makers and authorities in arranging his pocket-book for a day's sport. The salmon-rod should be powerful, the tackle strong and secure. Hooks and lines should be examined and tested before being used. The points to be studied in A. are, the casting and working of the line and fly, the character of the water in which the fish lie and will rise to the fly, how to act when the fish rises, and how to manage him when hooked. See CASTING. The two former points can only be successfully studied under practical instruction by the river.

When a fish rises, you must not strike simultaneously, because you may probably see the fish before he has seized the fly. If, therefore, the angler cannot control his nerve, he had better not watch the spot where his fly is, lest he be flurried, and so jerk the fly out of the aim of the fish. You must wait till you feel the fish, and then simply raise the rod. A violent jerk is worse than useless, as by it you may pull the hook out of the mouth of the fish, or very likely break the line. On hooking him, do not for a moment suppose that he is surely yours; the battle has but begun. His tactics are various. He may fly down the river like an arrow, and exhaust your line; it may then happen that a deep pool, tree, or other hindrance prevents you from following down. The enthusiastic angler who can swim will probably do so sooner than be defeated. Or the game of the fish may be to make for some sharp-edged stone or rock, and there cut the line.

On hooking a fish, the angler must throw the point of his rod over his shoulder, and, in technical language, 'show the butt' to the foe. If possible, keep up with him. If he leaps or plunges, trying to break the line with a stroke of his tail, slacken instantly, but recover without delay. Keep very cool and vigilant. Never be violent, but keep a moderate pressure on the fish when he tries to recruit his strength after a run.

While from its greater strength and activity the salmon affords superior sport to that given by the Trout (q. v.), the latter, as his character has developed in our streams, is an immeasurably more cunning fish. Consequently, for his capture, much more science and dexterity are required. We limit this remark, however, to the river-trout; for the lake-trout, though as a general rule superior in size and quality to those of the river, are infinitely less wary; nor does continued fishing seem to increase their wariness as it unquestionably does very rapidly increase that of our river-trouts. The most celebrated lake-trout in Scotland, and probably in Great Britain, is that of Loch Leven in Kinross. It is almost as red in the flesh as a salmon, and beautifully formed. Those caught average a pound in weight; but they are frequently taken from one and a half to three pounds weight. They are taken with a large artificial fly, in deep, clear water, and the

novice may chance to bring home a better filled creel than the veteran in the A. art. No such result is possible in the streams of the S. of Scotland, at least when their waters are clear, when the greatest skill is required for the capture of the trout. If the artificial fly is the lure used, it must be small and very lightly dressed; but even with these requisites, in clear, deep water, where the trout has time to inspect the lure before reaching it, it will hardly deceive him. The water for the fly-angler must be ruffled on the surface, and should not be more than eighteen inches deep. The angler must know almost to an inch where the trout will be lying for the purpose of feeding, which will, as a general rule, be where he will get most food with least trouble. He will lie where a bush overhangs the stream, in a run of water under the bank, under the shelter of a boulder, or in the smooth water by the edge of the rough. To the required science, the accomplished fly-fisher must add dexterity to drop the lure lightly and naturally before the mouth of the fish, whose instinct, if he be feeding, will then lead him instantly to seize the supposed insect. But instantly also will he discover the deception, and before the unpractised angler has either seen or felt the trout, he will try to eject the hook, and will probably succeed in doing so. In the perfect fly-fisher the eyesight has been trained to detect the trout in the act of seizing the fly; a slight twitch of the wrist then almost surely hooks him. What is technically called the *rise* of the trout is the first intimation which the ordinary angler gets of his presence. This is the break on the surface of the water caused by the trout turning to go down again after taking a fly; and before making this turn, if the fly is artificial, the fish will have tried to eject it. If he has succeeded, it is plain that the strike is too late; on the other hand, if the trout has hooked himself, it is unnecessary, and if done too strongly, the hook may be pulled out of the mouth of the trout, or the line broken.

Whatever be the lure used by the trout-angler in much and skilfully fished streams, infinite care must be taken to elude the trout's eye, which is wonderfully keen and vigilant. Next to the artificial fly, worm is the lure most used in trout-fishing. For its success in clear water, the same knowledge of the haunts and habits of the trout is required as in fly-fishing. The same training of eyesight is not, however, necessary. Bait being a reality, the trout, unless alarmed, will not reject it after seizing it as it does an artificial fly. It runs off with it to its lair, causing the line as it does so to twitter. A gentle strike or pull *downwards* should then be given.

The Grayling (q. v.) is to be angled for in the same way and with much the same tackle as the trout. It is, however, less wary than the trout, and is in condition at a different season. Great care must be taken after hooking a grayling, as the flesh of the mouth is very soft, and the hook therefore comes easily out.

The Pike (q. v.), which is to be found only in still, deep water, may be taken with a variety of lures. The spoon and swivel is often effective, but we prefer a small trout to anything else. The angler should never strike in pike-fishing with bait. Time must be given for the fish to swallow the bait, which will take several minutes. Till the process is completed, the line must be held slack, as any resistance will scare the fish. The pike-hooks must be attached to wire.

In other branches of the art of A., the tackle should be of the best, and in trout-fishing of the finest. But the angler should have nothing showy either in his tackle or equipment. Nor in trout-fishing should he embarrass himself with a multitude and variety of flies. Gaudy flies are of no avail in trout-fishing, at least in the rivers of the N. The black spider is an unfailing fly all the year round. The red and dun spider are excellent, as is also a woodcock wing with a hare's ear. We should consider ourselves amply equipped for a day's fishing with three or four, or at most, six of each of these. We give no directions for dressing, because no one can learn to dress from a book. The fly-rod should be light, and not above ten or eleven feet long. The rod for bait should be sixteen feet long. The reel should be brass, and of plain construction. We earnestly dissuade all anglers from using a complex reel. The plain one never goes wrong, the complex never fails to do so, and we have seen many a day's sport ruined in consequence. Hair and silk mixed make a good reel-line. It should be dried after use. The reader is referred to *The Practical Angler*, by W. C. Stewart; *Hints to Anglers*, by Adam Dryden; *Book on Angling*, by F. Francis; and *Angler's Companion*, by Thomas Stoddart.

Anglomani is a noticeable predilection for English habits and institutions among foreigners. Instances of A. were the avidity with which translations of all kinds of English books were read during the 18th c. in Germany, and the rule of English 'fashions' in France on the eve of the great Revolution, when the free institutions of England excited the enthusiastic admiration of the friends of liberty.

Anglo-Saxon Language and Literature. 'Anglo-Saxon' is the term commonly, though not correctly, employed to denote the language which Englishmen spoke and wrote before the Norman Conquest. This language is simply the first historic form of English, and those who used it neither called nor supposed it anything else. But the lapse of time wrought so many changes in its form, that when it ceased to be immediately intelligible, men came to regard it as a sort of foreign tongue, and gave it the misleading name it still retains. It seems necessary, therefore, to consider the earliest form of English under this heading, though it is important always to remember what A. really is. The Low German tribes, who in the 5th and 6th centuries invaded and occupied the greater part of S. Britain, must, of course, have brought with them from the mainland of Europe their own form of Teutonic speech, with dialectic peculiarities corresponding to the geographical divergences of the invaders. These peculiarities would doubtless establish themselves in Britain, or at any rate would become the source of new distinctions there. Historical criticism favours this view, for in the earliest times we can trace the presence of two, if not more, dialects of English in use even for literary purposes. It would be interesting to know what was the exact form of English at the date of the first invasions; but not a vestige of literature survives that was committed to writing for more than two hundred years after the legendary dates of Hengst and Horsa. The composition of Beowulf (q. v.) may go back to the first half of the 5th c., but for us it only exists in a MS. of the 7th or 8th. We are, therefore, unable to show that the English of the 5th or 6th c. was precisely the same as any Continental dialect of Low German spoken between the Rhine and the Baltic. In fact, there are such differences between the oldest recorded forms of English and of the other Low German dialects, that one is tempted to believe that all, or nearly all, who spoke the special dialects of the English invaders must have emigrated to Britain. The nearest approach to the oldest English is seen in the old Saxon of Rhenish Prussia and Westphalia, and still more in the old Frisian of Holland. Dr Latham, in his work on the *English Language*, furnishes ample evidence of this. Of the different dialects of English presumably used in our island at this period, the two most notable were the *Anglian* of Northumbria and the *Saxon* of Wessex, of which the former is probably the more ancient in form, as it stands nearer to Frisian and Norse. It was certainly the first that was put to literary use; but the ravages of the Danes in the N. and E., and the rise of the kingdom of Wessex under Ælfred and his successors, gradually made the 'Saxon' of the S. the classic or standard dialect of English for the whole country, and such it remained till the tremendous disaster of Hastings destroyed its supremacy, when all the dialects of the vernacular rapidly sank into an equality of degradation and contempt.

When we speak, then, of A. or English, before the Norman Conquest, we substantially mean the dialect of Wessex, for it is mainly, though not exclusively, in that dialect that the earliest English literature has come down to us. It differs from later forms of English, not merely by the possession of a large number of words which have now ceased to be used, but still more by the possession of a system of inflections which changes the aspects of words that might otherwise have been not quite unfamiliar, and by material differences in orthography. Vestiges of the old grammatical structure are abundant in the English of the middle ages, and even yet survive; e.g., the plural form *en* (Old Eng. *an* of the 1st declension) in *children*, *brethren*, and *oxen*; *hosen*, *shoon*, *eyne* (Sc. *een*) are archaic rather than obsolete; the *s* and *es*, which is the *as* of the 3d, and the so-called irregular, *feet*, *men*, *teeth*, *mice*, *lice*, *geese*, which have similar though not identical forms in the English of the 9th and 10th centuries. Our comparative and superlative degrees, our declension of pronouns, have not greatly changed; and the adjectival *lic* may still be recognised in the modern *ly*. But though it would be easy to show that we still liberally use the prefixes and suffixes of nouns that were in use before the

Norman Conquest, and have only modified rather than abandoned other distinctive forms, yet so much has gone, and so much has changed, that it requires a special study to master the language of *Ælfred*. The best grammars on the subject are Raak's *Angelsächsisch Sprachlehre* (Stockh. 1817; translated by B. Thorpe, 1865); Koch's *Historische Grammatik der Englische Sprache* (1863-69); Mütsner's *Englische Grammatik* (1860-65); and March's *Comparative Grammar of the Anglo-Saxon Language* (1870).

The oldest extant fragment of English literature is unquestionably the Runic verses from Cadmon's poem on the Crucifixion, which are found on the stone cross in Ruthwell churchyard, set up about 680 A.D. The form, of course, is Anglian or Northumbrian, and it may here be noted that the earliest English literature belongs to the N., and not to the S. No earlier name than Cadmon's is to be found. Bede and Alcuin were also Northumbrians. The former, indeed, wrote mostly in Latin, though we know that he was engaged on a translation of St John's Gospel at his death; while the latter carried away his learning and energy to benefit a foreign people. Other specimens of English which have come down to us from the Northumbrian region, are a second fragment of Cadmon (737), a *Psalter* (800), the *Rushworth Gospels* (900), and the *Lindisfarne Gospels* (970). By far the greatest part, however, of the pre-Norman literature of England has reached us only in the Wessex dialect, no matter in what part of the island or in what dialect it may have been originally produced. Some poems in this dialect are even older (in the opinion of several critics) than the first invasion of Britain; e.g., *Beowulf* (q. v.), a genuine Norse epic, with a certain Homeric simplicity and breadth of portraiture; the *Traveller's Song* and the *Battle of Finnsburgh*. See, however, the introduction to Arnold's *Beowulf* (Lond. 1876). The introduction of Christianity almost suppressed this fierce heathen literature, which drew its highest inspiration from the fury of battle, but its place was taken by a literature of nobler origin and a more beneficent spirit. Cadmon (q. v.), who belongs to the 7th c., is, as we have said, the earliest name in English literature, strictly so called, and his metrical paraphrases of Scripture show the new tendency of the national genius under the benign influence of the gospel. Very few, however, of the English religious poets who flourished before the Norman Conquest are known by name: only a fatherless brood of pious verses, hymns, psalms, allegories, tales, and translations of Scripture have survived, of the most notable, perhaps, are the *Judith*, the *Phoenix*, *Andreas*, *Salomon* and *Saturn*, a poem on *Death*, and an *Address by the Departed Soul to the Body*, the various pieces now generally ascribed to a 'younger' Cadmon, as the *Christ and Satan*, *Christ's Descent into Hell*, *The Day of Judgment*, &c., most of which, besides many others, can be found in the Exeter or Vercelli MS. Particular poems have been published by Fox (Lond. 1830), Thorpe (Lond. 1832), Bouterwek (Elberf. 1847), Grimm (Cassel, 1840), and the whole body of poetry belonging to this period of English history has been collected and published by Grein in his *Bibliothek der Angelsächsischen Poesie* (Gött. 1857-58). See also Thorpe's *Analecta Anglo-Saxonica*, Turner's *History of the Anglo-Saxons* (7th ed. 1852), and Kingston-Oliphant's *Sources of Standard English* (Lond. 1873).

While the oldest poetic literature of England is remarkable in point of style for its obscurity, harsh inversions, incessant ellipses, and ambitious metaphors, the contemporary prose, on the other hand, is distinguished for its straightforwardness and simplicity of structure. A student finds it rather hard to read Cadmon, but very easy to read *Ælfred*. The chief prose works are the *Civil and Ecclesiastical Institutes of the English Kings from the time of Æthelbert to that of Canute*; *Ælfred's Translations* (with additions) from Orosius, Bede, Boethius, and Gregory the Great; the *Chronicle*; the *Homilies of Ælfric* (q. v.) and his version of part of the Bible; and the Durham version of the Gospels. See Turner's *History of the Anglo-Saxons*, and Thorpe's *Analecta* (as above); also Marsh's *Origin and History of the English Language, and of the Early Literature it embodies* (1862).

Anglo-Saxons, the name commonly given to the various tribes of Low Germans who from the middle of the 5th c. began to establish themselves in parts of Britain. The accuracy of the term is disputed by recent historical writers, who maintain that it is misleading, inasmuch as it suggests what is unquestionably a false notion, viz., that the so-called A. were something else than English, whereas they were in reality English pure and simple, without any foreign admixture at all, and who further maintain

that it is absurd for us to call a nation Anglo-Saxon that called itself *Englisc* (English), only using the rare term Anglo-Saxon to denote the two tribes of Angles and Saxons. There is so much truth in this contention, that were it not for the force of usage, the probability is that the name Anglo-Saxon, which is of comparatively recent origin, would not survive a decade.

History.—The story of the first appearance of the Jutish warriors in Britain has manifestly reached us in a somewhat legendary guise; but as it rests on the venerable authority of Bede (8th c.), and of the *Chronicle* (9th c. *et seq.*), and as we have nothing definite to put in its place, we must, in the main, accept it. According to this story (*Hist. Eccl.* lib. i. c. xiv. and xv.), Vortigern, King of the Britons, unable to oppose an effectual resistance to the savage inroads of the Picts, who made havoc of the southern half of the island after the withdrawal of the Romans (410 A.D.), sent for help over seas to Germany. Hengst and Horsa arrived with an armed force in 449, and soon drove back the barbarians; but, charmed with the fertility and beauty of the land, they resolved to possess it, and having told their kinsfolk and neighbours in N. Germany how easy it would be to conquer the country, shiploads of eager warriors—Angles, Saxons, and Jutes—were soon carried across to Britain.* The records of their exploits are extremely meagre. In spite of the annalistic precision of the *Chronicle*, anything like a continuous narrative is impossible. We gather that invasions from Germany continued to take place for nearly a century, and that finally, in spite of desperate spurts of heroism on the part of the British, and gleams of unavailing triumph (of which the legend of King Arthur preserves the splendid memory), the whole country E. of the Penine and Devonian ranges passed into the hands of the newcomers. Their distribution in this region was as follows: The Saxon and Jutish peoples occupied the districts S. of the Thames as far W. as Devon or Cornwall, while the Angles (whose early supremacy is undoubted) obtained possession of the remainder, from the Thames to the Firth of Forth, and from the Severn to the North Sea. Altogether, seven states are reckoned, which are commonly spoken of as the *Heptarchy* (q. v.), viz., Kent, Sussex, Essex, Wessex, East Anglia, Mercia, and Northumbria. Three of these in succession came markedly to the front, first Northumbria, in the time of *Eadwine* (mod. Edwin, 617-633); then Mercia, in the time of Offa (757-796); and lastly Wessex, from the days of Eggbriht or Egberht (mod. Egbert, 802-838), who was the first prince that really deserved the name Bretwalda ('wielder of Britain'), because he brought all the English states under his power. He conquered all the Saxons and Jutes, and became liege-lord of the East Angles, Mercians, and Northumbrians, whose kings were compelled to become his 'men' or 'vassals.' The supremacy of the Wessex dynasty continued, except during the Danish interregnum (1017-42), down to the period of the Norman Conquest; but the first of this line who was the sole ruler of England was Æthelstan (925-940) (see ÆTHELSTANE), ever after whom the country continued to be a monarchy.

Laws, Constitution, &c.—Each state of the Heptarchy had doubtless its special laws and customs brought over from Germany, or developed in Britain. Æthelbert reduced to writing the traditional legal usages of the Kentish Jutes; Ina, King of Wessex, Offa, King of Mercia, and other sovereigns, from time to time published their 'dooms' or judgments; but Ælfred was the first who was in a position to legislate for the whole, or at least the greater part, of the English nation. A great reformer, he was essentially conservative, and in his new code or collection of dooms he mainly contented himself with reproducing in an amended form the work of his predecessors, adding few statutes of his own, because, as he modestly put it, he did not know how those who came after him might like them.

Speaking generally, it may be said that the various English states were from the first a group of united monarchies, and, after their consolidation into one, this character continued to mark them as strongly as before. The *Cyng* ('king') was, no doubt, descended from Woden, and therefore of divine origin, but he was not absolute. He was guided by a kind of parliament called the *Witena-gemót* ('meeting of the wits' or 'wise'), which he had the power to summon, but not to dismiss. All

* In *Words and Places*, by the Rev. Isaac Taylor, there is a curiously interesting chapter on the *Anglo-Saxons*, in which he seeks to show that numerous other German tribes or families besides those mentioned in the text must have taken part in the conquest and colonisation of Britain.

freemen had the right to attend. So long as England was cut up into numerous small states, it might be possible for a considerable number of freemen to take part in the proceedings; but after England became a monarchy the thing was impracticable, and the Witenagemot would only be attended by the great nobles and prelates. The powers of this assembly were very considerable. It elected the king, and, with his consent, it made laws or treaties, and appointed or removed the officers of state.

The office of king was always elective. If a deceased king's son was too young to succeed his father, or otherwise unfit, the Witan would pass him over, and choose an older or an abler kinsman. Thus Ælfred succeeded Æthelred, though Æthelred left a son behind him. The aristocracy was composed of (1) the *æthelings* ('princes'), the members of the royal family, or those related to them by blood or marriage; (2) the *ealdormen* ('eldermen' or 'senators'), governors of shires, or even of subordinate states, sometimes called, with reference to their military functions, *heretogas* ('army leaders'), and latterly, owing to Danish influences, *eorlas* ('earls,' Dan. *jarl*), with whom may be classed the great prelates of the Church—bishops and abbots; (3) the *thengas* (from *thengian*, to serve), a class of lesser nobles or landholders, like the vassal gentry of the feudal ages. All landholders were under an obligation to serve in the *fyrd*, or militia (from *faran*, to go on march; literally, therefore, the body that may be summoned to 'go' upon an expedition), and to repair fortresses and bridges. The common body of freemen were called *ceorlas* ('churls,' Lowl. Sc. *carles*; Ger. *herlen*), and it was in contradistinction to this name that the term *eorlas* ('earls') was applied to the better-born freemen. Another element in the population, though not in the state, was the *thralls* ('thralls'), or *thowas* ('slaves'), who were naturally most numerous along the Welsh border. In the greatest matters the king and the nobles acted for the nation, but in smaller matters the people governed themselves pretty thoroughly. Thus each 'shire' had its local parliament (*Schiregemot*), over which the *ealdorman* presided like the modern lord-lieutenant of a county, but he could decide or carry nothing without the concurrence of the thanes and the representatives of townships. With him were latterly associated the *Schirgerefa* (sheriff) and bishop. Again, the 'shire' was subdivided into *hundredu* ('hundreds'), each of which had its subordinate court, and the 'hundreds' were in turn subdivided into *tithunga* ('tithings'), so called because they must contain ten freemen, heads of families, who were responsible for each other and for the wellbeing of the district. This still lingers among us under the name of the 'parish vestry.'

Religion.—When the English first came to Britain, they were heathens, and continued such for 150 years. The fierce struggles going on between them and the Britons in every part of the island put missionary operations on the part of their defeated and embittered adversaries out of the question; and indeed, if one may judge from *Gildas*, British Christianity itself was not in a very healthy condition at the time. Woden (Dan. *Odin*) and Thunder (Dan. *Thor*), incarnations of valour and strength and violence, were the gods most deeply revered by the invaders. Their worship was set up in the conquered isle; it rooted itself deeply amidst the storms of strife, and became a patriotism as well as a faith. The memory of the heathen deities is still preserved in the names of the days of the week, and other traces of the old religion still lurk in the words we use and the customs we follow. But in the year 597 a Roman abbot, Augustine, with a band of forty monks, landed in the isle of Thanet, at the very place where Hengst and Horsa had landed a century and a half before. Pope Gregory had sent them to preach the gospel to the new race that peopled the country, and, if possible, to build up anew, under holier auspices, the fabric of Roman authority. Circumstances favoured the attempt. The King of Kent, into whose territories they came, had married a Christian princess, Bertha, daughter of the Frankish King of Paris, who was permitted to practise the rites of her religion in her new home. Gregory counted rightly enough on her influence. Hardly a year had passed when her husband Æthelberht accepted the new faith, and was baptized. His thanes rapidly followed his example. But Æthelberht was at this moment the most powerful ruler in England. He was *Bretwalda*. The other kings acknowledged him as their 'over lord.' His daughter Æthelburh married Eadwine, the great King of Northumbria, and carried with her Paulinus, a follower of Augustine. By his

zeal the northern English were also converted to Christianity. Nothing in Bede is so beautiful as the story of this conversion. Under Penda, King of the Mercians, a heathen reaction took place which for a while threatened the very existence of Roman Christianity. But help came from an unexpected quarter. Oswald, the successor of Eadwine, had in his youth found a refuge in the Scotch-Irish monastery of Iona, and when he had recovered Northumbria, and restored its greatness, it was Celtic monks from this lonely isle that kindled anew the flame of religion in his dominions. The labours of Aidan (q. v.) and his disciples of Lindisfarne have been generously recorded by Bede, but the most glorious triumphs were those of the Northumbrian Cuthbert (q. v.) Gradually heathenism died away under the ceaseless propagandism of Celtic and Roman missionaries. A conflict arose between the two, trivial in itself, but involving the question of the supremacy of Rome or Iona. It was decided (664), in a synod held at the Abbey of Whitby, in favour of the former. The Irish monks withdrew from Lindisfarne, and the Church in England was built up under Roman supervision. It owes its distinct organisation as an ecclesiastical institution mainly to the Greek monk Theodore of Tarsus (668–690), but it was perhaps first effectually brought into harmony with Rome by the policy of St Dunstan (q. v.) in the 10th c. Even to the last, however, it retained something of national independence, and at the Norman Conquest it was found necessary to put foreign prelates at its head. See Kemble's *Saxons in England* (2 vols. 1849), Lappenberg's *Geschichte von England* (Hamb. 1834–37), Freeman's *History of the Norman Conquest* (1867–75), his *Old English History* (Lond. 3d ed. 1875), and J. K. Green's *Short History of the English People* (Lond. 1875).

Angola, a country or territory in Lower Guinea, subject to Portugal, bounded on the S. by the river Coanza, and on the N. by the Danda. It is naturally divided into three regions: (1) A flat stretch of coast generally barren, except along the banks of rivers, where, however, there is a fulness of tropical productions, sugar-cane, coffee, palm oil, manioc, banana, &c.; (2) a hilly plateau, about 2500 feet above the sea, remarkable for its immense forests; (3) an eastern region, at first higher than the second, but gradually sloping to the broad Quango Valley, where the soil is fertile as the bottoms of the Mississippi, but lies fallow, as the Portuguese, instead of developing the natural wealth of the country, devote themselves to trading in wax and ivory. A great variety of wild animals abound in the interior, which is almost unexplored. The country is rich in copper, iron, and silver. The Portuguese discovered A. in 1486, and have held it ever since, except from 1641–48, when the Dutch were masters of the capital and part of the colony. The colonists are still few in number, and confined in isolated forts and settlements named *feiras* or fairs. The entire population is estimated at 240,000, of whom 238,000 are negroes, belonging to the great Bunda race, and marked by considerable culture. Many can both read and write, thanks to the Jesuit missionaries, who have long been at work here. The capital is São Paulo de Loando (q. v.) The name A. is often applied to the entire W. African coast from Cape Lopez to São Felipe de Benguela. See Lopes de Lima, *Ensaio sobre a Statistica das Possessões Portuguezas na Africa Occidental e Oriental*, &c. (Lisb. 1844); Tams, *Die Portug. Besitzungen in Westafrika* (Hamb. 1845); Valdez, *Six Years of a Traveller's Life in Western Africa* (2 vols. Lond. 1861).

Angon, a kind of spear in use among the Angles, Franks, and other Teutonic peoples, either for thrusting or hurling. The shaft was made of wood, but was almost wholly covered with iron. At the head were two barbs.

Angora (anc. *Ancyra*), the capital of a Turkish vilayet of the same name in Asia Minor, pleasantly situated on the river Fingiri, 220 miles E.S.E. of Constantinople. It was founded, according to tradition, by Midas, the son of Gordius, and after the irruption of the Gauls into Asia Minor, it became the chief town of the Tectosages about B.C. 277, and subsequently the capital of the Roman province of Galatia Prima. Occupying a position favourable for commerce, it early became the emporium for the Eastern trade. The Christian Churches of Galatia held three councils at A. in the 4th c., and it was the scene of a fierce battle between the Turks and Tartars (1402), in which the Sultan Bajazet was defeated and taken prisoner by Timur. The chief monument of antiquity is the white marble temple of

Augustus, containing the famous *Monumentum Ancyranum*, recording the deeds of the emperor. This valuable inscription was discovered by Busbecq, 1553, and the latest copy of it is contained in Hamilton's *Researches in Asia Minor*. A. is the chief residence of the Armenian Catholics in Asia Minor. One of the chief employments is the preparation of Oriental morocco leather from the skin of the celebrated A. breed of goats. Pop. (*Journal Officiel de la Répub. Française*, 1874) 38,138, chiefly Turks and Armenians.

Angora Goat (*Capra Angorensis*), a variety of goat inhabiting Asiatic Turkey in the districts around Angora and Beibazar. The body-colour is milky white, the short legs being black. The horns are spiral, and are spread outwards and backwards. The hair is long and silky, and is disposed in spiral ringlets or curls. It was first imported into European markets under the name of *Mohair*. In Turkey the finest robes are made from this material. Smyrna forms the chief place of export for the unspun hair, and a large quantity is also imported from Constantinople. It is chiefly employed in the manufacture of trimmings, braid, shawls, &c. Bradford and Norwich are the chief seats of this manufacture. The import in 1864 amounted to 4,737,330 lbs., valued at £650,191. The goatherds are very careful of their flocks, and frequently comb and dress the fleeces.

Angornow, the most important town in Bornu, Central Africa, near the shore of Lake Chad, 20 miles S. from the capital, Kuka. It lies in a fertile plain, and is liable to inundation. It has a great weekly market, and is the centre of an extensive trade in slaves, cotton, amber, coral, and metals. Pop. about 30,000.

Angostura, a river-port, capital of the province of Guiana, in the republic of Venezuela, S. America, lies on the Orinoco, nearly 240 miles from its mouth. It is built at a place where the immense river narrows to a width of 3134 feet, whence its name, signifying a strait. This strait marks the limit at which the Orinoco is affected by the ebb and flow of the tides. The town, which is meanly constructed, stands only 191 feet above the sea-level, and the quays are often inundated; but the climate is comparatively cool, tempered as it is by the steady trade-winds. The most important exports are cacao, indigo, cotton, tobacco, sugar, A. bark, hides, and cattle. Shoals and currents on the river make A. rather difficult of access for sailing vessels, but its position is in many respects highly favourable to commerce. A. was founded in 1764, and at first was called *San Tomas de la Nueva Guayana*. In 1819 the congress met here which declared Venezuela part of the great republic of Colombia—a lofty conception of Bolívar's, in whose honour A. was called *Ciudad Bolívar*. Before the war of independence A. was prosperous, and though it suffered much in the struggle, it rapidly recovered after peace had been restored; but of late years its progress has been greatly retarded by civil disturbances. Pop. 7000.

Angostura Bark. This bark, which is used as a tonic and febrifuge, is obtained from *Galipea officinalis*, a tree found in Guiana, and belonging to the natural order *Rutaceae*. *G. Cusparia* also yields a variety of A. B. It is not much used in Britain. A false, poisonous A. B., that of *Strychnos Nux vomica* (q. v.), was at one time substituted for the genuine bark, which occasioned serious accidents, and led some of the Continental governments to prohibit its use.

Angoulême, capital of the department of the Charente, France, on the Charente. Pop. (1872) 22,109. It has manufactures of paper, earthenware, and linen and woollen fabrics, a college, and a natural history museum. Wine and saffron are products of the district. A. is the old *Iculisma* of Aquitaine, and has been the seat of a bishop since 379. Chlodwig took it from the West Goths in 507, and laid the foundations of a cathedral. Soon after it became important, and during the whole of the middle ages played an important, indeed a foremost, part in French history. Marguerite of Navarre, authoress of the too notable *Heptaméron*, was born in the ancient castle of A., a fragment of which is still standing.

Angoulême, the titular name of more than one great historic family of France. The first Comte d'A. is said to have been one Turpin (839-863), whose last male descendant was Adé-

mar, who died about 1218. His daughter Isabella, widow of John, King of England, married Hugues X. Comte de Marche. After the death of Hugues XIII. (1303), the counties of A. and Marche were united to the crown of France by Philippe le Bel. Louis, Duc d'Orléans, who died in 1407, second son of Charles V. of France, received the county of A. as an appanage. His grandson Charles, who died in 1496, was the father of François I., who was Comte d'A. before his accession to the throne in 1515. He immediately raised the county into a duchy, and gave it to his mother, Louise of Savoy. The title of Duc d'A. has been since borne by Charles, third son of François I.; by Charles IX.; by Charles of Valois, natural son of Charles IX.; by Louis Emmanuel, son of Charles of Valois; and by Louis Antoine, eldest son of Charles X.

Angoulême, Louis Antoine de Bourbon, Duc d', and afterwards Dauphin of France, was the eldest son of the Comte d'Artois, subsequently Charles X. of France, and was born at Versailles, 6th August 1775. When the Revolution broke out he retired to Italy, where he devoted himself to military studies. In 1792 he received the command of a body of French emigrants in Germany, but his campaign proved a failure, and he withdrew into private life till the allies entered France in 1814. The time was spent at Holyrood, on the Continent, and latterly in England. On the recall of Louis XVIII. he was appointed lieutenant-general of the kingdom, but from want of military experience, and perhaps incapacity, found himself unable to cope with the Bonapartist movements that followed the return of Napoleon, and was obliged to surrender himself a prisoner 15th April 1815, but soon regained his liberty. In the Spanish war of 1821 he was nominal commander. In July 1830 he signed an abdication of his claims to the French throne in favour of the Duc de Bordeaux, his nephew, and again accompanied his father into exile. After a year or more spent at Holyrood he went to Austria, and died at Gorz, 3d June 1844.

Angoulême, Marie-Thérèse-Charlotte, Duchesse d', daughter of Louis XVI., born 19th December 1778. After long imprisonment she was exchanged for some French prisoners held by the Austrians, and lived at Vienna. On the 10th June 1799, she was married, at Mittau, in Courland, to the Duc d'Angoulême, her cousin, whom she much surpassed in vigour and quickness of intellect. Napoleon pronounced her 'the only man in her family.' She died 19th October 1851.

Angra, the capital of the Azores, lies on the island of Terceira, and has a good harbour. It is strongly fortified, exports wine, flax, and grain, and is the seat of the Bishop of the Azores. The Portuguese governor-general resides at A., and the town contains a military college and arsenal. Pop. 12,000.

Angri, a town in the province of Salerno, S. Italy, 17 miles N.W. of Salerno. It lies amid vineyards and cotton plantations. Pop. 6921.

Anguilla. See EEL.

Anguilla, or **Little Snake**, one of the most northerly of the Leeward Islands, about 60 miles N.W. of St Christopher, with an area of 35 miles, and a pop. (1871) of 2773, chiefly blacks. It belongs to England, is under the governor of St Christopher, and is governed locally by a stipendiary magistrate. It exports some cotton, tobacco, and sugar.

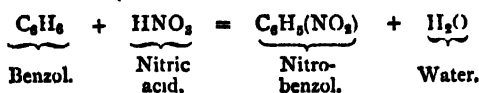
Anguis. See BLIND-WORM.

Anhalt, a state of the German empire, formerly an independent principality, lies on the Elbe, Mulde, and Saale, almost surrounded by Prussian Saxony. Its surface is level and fertile. There are manufactures of woollen, hardware, &c., but the inhabitants, who are generally Protestants, find their chief employment in agriculture, producing wheat, tobacco, wine, flax, and hops. There are mines of iron, copper, and lead. Area, 880 sq. miles; pop. (1875) 213,689. A. dates as an independent principality from the 13th c. Formerly divided into four duchies, it consisted from 1793 to 1853 of three, A. Köthen, A. Bernburg, and A. Dessau. In 1853, A. Dessau and A. Köthen were united under the title of A. Dessau-Köthen; and in 1863 the two, A. Bernburg and A. Dessau-Köthen, were also united, and now form the sovereign duchy of A. The capital is Dessau.

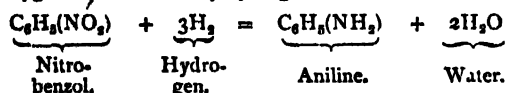
Anhydrous is a term used in chemistry to express without

water. A. bodies may be those which contain no water as an impurity, or those which are not combined with water. Thus A. alcohol is pure or dry alcohol, free from admixture with water, whereas A. sulphuric acid, or sulphuric anhydride, SO_3 , is quite a different body from hydrated sulphuric acid or oil of vitriol, H_2SO_4 or $\text{H}_2\text{O}_2\text{SO}_3$, which contains the former body combined with water.

Aniline is a liquid substance containing carbon, hydrogen, and nitrogen. Itself of little interest except to the chemist, A. has nevertheless of late years become of immense commercial importance on account of the numerous and beautiful dyes which have been prepared from it. See ANILINE COLOURS. A. was first obtained by distilling indigo with caustic potash, and derives its name from this circumstance, the Portuguese for indigo being *anil*. It is now, however, solely prepared from benzene or benzol, a liquid composed of carbon and hydrogen, occurring in considerable quantities in gas-tar, and separable from that substance by Fractional Distillation (q. v.) See BENZOL. The benzol is first treated with nitric acid, when nitro-benzol, or essence of mirbane, results.



The nitro-benzol is then treated with iron-filings and acetic acid, and is converted by this process into A. The chemical change which the nitro-benzol suffers consists in a *reduction* or loss of oxygen by that body, and the partial replacement of the oxygen thus removed by hydrogen.

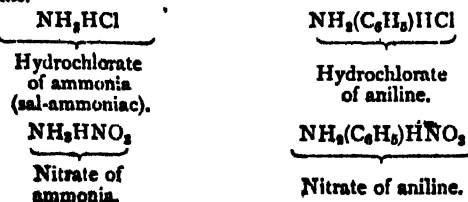


The A. is purified by distillation. A. is a colourless liquid when quite pure, of an oily consistence, and slightly heavier than water (sp. gr. 1.02). It boils at 182°C . It may be subjected to intense cold without freezing. It possesses a peculiar and characteristic odour, of a somewhat ammoniacal character.

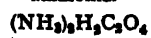
Exposed to the air, A. rapidly darkens in colour, and is eventually converted into resinous products. It produces a yellow stain when dropped on wood; but its most characteristic reaction is the violet colour produced when it is mixed, even in minute quantity, with a solution of chloride of lime. A. is poisonous, and its vapour, if inhaled, is said to produce a kind of intoxication which is exceedingly dangerous. It is inflammable, soluble in all proportions in alcohol and ether, but only to a small extent in water. In its chemical characters A. is closely related to ammonia, and belongs to the group of bodies called *amines*, substances derived from ammonia by the partial replacement of part, or the whole, of their hydrogen by hydro-carbon radicals. In the case of A. the radical is called 'Phenyl,' C_6H_5 , and in consequence A. is named by chemists *Phenyl amine*.



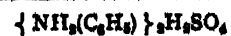
A. combines with acids to form salts analogous to the ammonium compounds, and these for the greater part are solid crystalline substances, almost without exception colourless. The relation in composition between the salts of A. and ammonia will be best understood by an inspection of their respective formulae.



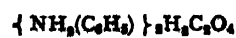
Sulphate of ammonia.



Oxalate of ammonia.



Sulphate of aniline.



Oxalate of aniline.

Aniline Colours. The aniline or 'gas colours' have now almost superseded other dyes, on account of their wonderful brilliancy, diversity of colour and shade, and the ease with which they are fixed on the fabric. They are the origin of an enormous industry both in this country and on the Continent—an industry still on the increase—and are not only remarkable from an industrial standpoint, but equally on account of the beautiful researches into their nature and composition which have been made by some of the most eminent chemists of the day. Originating from a substance long regarded simply as a chemical curiosity, and without practical use or importance, they furnish an admirable illustration of the value of abstract inquiry, and of the services of modern chemistry.

It had been known to chemists for some time that aniline, when treated with chloride of lime (bleaching powder), gave rise to a beautiful violet colour, but this fact was not turned to practical account till the year 1856, when W. H. Perkin succeeded in extracting and purifying the colour thus produced, and found that it was capable of easy fixation on silken and woollen fabrics. This was the first aniline colour prepared, and was patented by its discoverer under the name of *mauveine* or aniline violet. Two years later Hofmann succeeded in isolating the base of a red colour, which he called *rosaniline*; and a process for its commercial manufacture was shortly afterwards discovered by Verguin. By acting on rosaniline with the iodides of ethyl and methyl, Hofmann also succeeded in obtaining beautiful violet colours (Hofmann violets) and a green dye (iodine green). Since then, blue, black, yellow, brown, and grey dyes have been prepared from aniline, and at the present time almost every colour in the rainbow can be produced from this one substance.

The more important of the aniline dyes, with their mode of manufacture, are as follows:—

Anilin Violets—Mauveine, Aniline, Rosolan, Violine or Tyraniline. This colour is prepared on the large scale by treating sulphate of aniline with a cold dilute solution of bichromate of potash, and allowing the mixture to remain for about a day undisturbed. The colour separates as a black precipitate, which is washed with water, then treated with naphtha to remove resinous by-products, and dissolved for the dyer's use in spirits of wine, methylated, or pyroxylic spirit. Aniline violet appears to be the sulphate of a base called mauveine, having the formula $\text{C}_{20}\text{H}_{19}\text{N}_3$.

Aniline Red—Rosaniline, Fuchsine, Azaline, Solferino, or Magenta—is produced by the action of oxidising agents on impure commercial aniline, which contains in addition to aniline, *toluidine*, a substance very similar to aniline in properties, and, in fact, homologous with it. The presence of toluidine is essential to the production of rosaniline, pure aniline producing by itself no red dye. A. R. is now almost solely prepared by the action of arsenic acid on commercial aniline (though corrosive sublimate, chloride of tin, nitric acid, chloride of carbon, and other bodies have been employed instead). The two substances are heated together for from four to ten hours, after which the resulting mass is boiled with very dilute hydrochloric acid, and to the solution thus obtained soda is added in slight excess. This occasions the precipitation of the red colour, whilst the by-products and impurities remain in solution. The precipitate is washed with water, and, dissolved in acetic or hydrochloric acid, forms the roseine of commerce. A. R. consists either of the acetate or hydrochlorate of the colourless base rosaniline, $\text{C}_{20}\text{H}_{19}\text{O}_2$, which combines with most acids to form coloured salts. These salts, when viewed by reflected light, have a green metallic lustre, like the wings of the rose-beetle, but by transmitted light they are red. Treated with nascent hydrogen, rosaniline takes up two atoms of that element to form another colourless base, called *leukaniline*, $\text{C}_{20}\text{H}_{21}\text{N}_3$.

Aniline Blues. By treating rosaniline with the iodides of methyl and ethyl, three atoms of hydrogen are replaced by the hydrocarbon radicals (methyl or ethyl), and beautiful violet

colours are produced. *Trimethyl rosaniline*, $C_{20}H_{18}(CH_3)_3N_3$, and *triethyl rosaniline*, or rather the hydrochlorate or acetate of these bases, are known in commerce as Hofmann's violets. By treating rosaniline with aniline, one, two, or three atoms of hydrogen may be replaced in the former substance by the radical phenyl (C_6H_5), and blue dyes are produced. Salts of mono-phenyl rosaniline, $C_{26}H_{24}(C_6H_5)N_3$, are known as *violet imperial rouge*; of diphenyl rosaniline, $C_{32}H_{22}(C_6H_5)_2N_3$, as *violet imperial bleu*; and of triphenyl rosaniline, $C_{38}H_{18}(C_6H_5)_3N_3$, as *bleu de Lyons* and *bleu de Paris*.

Aniline Green. *Iodine Green* is prepared by the further action of iodide of methyl (CH_3I) on trimethyl rosaniline, and has the formula $C_{20}H_{18}(CH_3)_3N_3(CH_2I)_2$.

Aldehyde Green is prepared by treating sulphate of rosaniline with aldehyde and bisulphite of soda. Little is known of its composition.

Aniline Grey is obtained by treating mauveine with aldehyde and sulphuric acid.

Aniline Brown is obtained by treating acetate of rosaniline with hydrochlorate of the same base.

Aniline Black is obtained by heating together chlorate of potash, aniline, hydrochloric acid, chloride of copper, sal-ammoniac, acetic acid, and starch paste. The colour first appears after exposure of the fabric dyed with it to light. It is almost indelible.

Aniline Yellow. Salts of a base called *chrysaniline*, $C_{20}H_{17}N_3$ —which differs from rosaniline in containing two atoms less hydrogen—are employed as yellow dyes. This base occurs among the resinous by-products of the manufacture of rosaniline, and is extracted from these matters by subjecting them to a jet of steam, when it is dissolved out. The picrate is usually employed by the dyer.

There are numerous other dyes employed in commerce, but the above are the most important. It should be remarked that the A. C. are fixed at once on silk and woollen materials without the use of a mordant, a simple immersion in their solutions being sufficient. Vegetable tissues do not so readily take up these colours, a previous dressing with size being necessary.

Animal and Animal Kingdom. The exact definition and limitation of the A. world is a matter of extreme difficulty, since many of the *Protohyta*, or lower plants, very closely approach, in appearance and structural details, the *Protozoa*, or lower animals. The higher groups of the A. and plant series are distinctly separable; but even in the case of these higher forms many striking points of similarity may be found. Animals and plants collectively constitute the *organic series* of natural objects. Minerals, and objects destitute of life, on the other hand, constitute the *inorganic series*. The possession of life, therefore, at once divides natural objects into these two great groups. *Form* alone will not separate animals from plants. Some animals (e.g., flustræ or sea-mats, zoophytes, &c.) are essentially plant-like in all the details of outward conformation, and in many respects of functional activity also. Between the lower plants and animals mere form affords no guide whatever. *Power of motion* will not enable us to distinguish between animals and plants, since many animals (e.g., sponges, oysters, corals, zoophytes, sea-mats, &c.) are in their adult state rooted and fixed, whilst many of the lower plants move freely about, and some higher plants possess powers of movement in their parts and branches (e.g., sensitive plant, moving plant, &c.) The *chemical composition* of animals and plants exhibits so many points of similarity and identity, that on this third head no exact differences are apparent. *Chlorophyll*, the green colouring-matter of plants, is found in many A. tissues (e.g., infusoria, hydræ, &c.) *Cellulose*, a characteristic vegetable product nearly allied to starch, is found in the tissues of sea-squirts—molluscous animals. *Glycogen*, or A. starch, is found in the liver and placenta of mammalia. And besides these examples of an interchange of chemical products between animals and plants, we also find that no one chemical product or element can be said to be thoroughly characteristic of one or other kingdom. *Nitrogen* is more abundantly, but by no means exclusively, found in animals; and *carbon* bears a similar relation to plants. The bodies of both are made up of protoplasm, a substance composed of carbon, hydrogen, nitrogen, and oxygen. The *intimate or microscopic structure* of animals and plants, also, fails to distinguish between these groups. The tissues of both are either cellular, fibrous, or molecular—or beyond the latter we

find the elementary matter of both animals and plants to consist of protoplasm.

The *nature and mode of assimilating the food* constitutes the sole means whereby we are enabled clearly or satisfactorily to separate animals from plants. The food of plants consists chiefly of *inorganic* matter. Animals require *organic* material for their food, and animals are therefore dependent either directly or indirectly upon plants for their support. Plants convert their inorganic food (consisting of gases, minerals, water, &c.) into organic products—such as starch, gum, sugar, &c.; whilst animals convert their organic food into products of *inorganic* kind. Animals require *oxygen* gas for their support; plants similarly require *carbonic acid*. Animals receive their food *within* the body, and assimilate it within the internal parts and tissues. Plants, on the contrary, digest their food in the *outer* surfaces or tissues of their bodies—such as the leaves, root, &c.; and only after being there elaborated is the product of digestion, or *sap*, sent to circulate through the tissues. The presence of a *nervous system* is not a characteristic of animals. Not only do many animals of comparatively high organisation want a nervous system, but plants appear in some instances to possess analogous means for the exhibition of irritability. See also ZOOLOGY, and articles relating to A. and plant life.

Animal Chemistry, the department of chemical science devoted to the analysis of animal tissues, and to the investigation of the chemical actions involved in the life processes and vital functions of animals. The elementary tissues of animals, or the protoplasm of which their bodies, like those of plants, are composed, consist of the four *essential* elements—*carbon*, *hydrogen*, *oxygen*, and *nitrogen*. It may be safely assumed that these elements are present wherever living tissues exist; and to these may be added the very general presence, in small and minute quantities, of *sulphur* and *phosphorus*. Silicon, fluorine, chlorine, sodium, potassium, calcium, magnesium, iron, and, more rarely, lead, copper, aluminum, and manganese, are the chief accidental elements found in the analysis of animal tissues. It is characteristic of animals and plants that their elements rarely if ever exist free or uncombined. On the contrary, their elements generally combine in high proportions to form intricate and complex compounds. The compounds of animal bodies are divisible into the *nitrogenous* or *azotised*, and the, *non-nitrogenous* or *non-azotised*. The former (sometimes called *gelatinous* and *albuminous* compounds) are represented by the *gelatin* of the bones, cartilages, and soft tissues generally of the body; by the *chondrin* of cartilage; by *albuminous matters* or *proteids*; by the *fibrin* of blood, lymph, and chyle; by the *casein* of milk; by the *syntonin* and *myosin* of muscles; by the *horny matter*, or *keratin*, of nails, hoofs, and hair; by the *mucus* of membranes; by the *pepsin* and *albuminous ferments*; and by the *colouring-matters* of the blood, bile, and other fluids. The *non-azotised* or *non-nitrogenous* compounds are represented by *fatty* or *oily* substances, containing *olein*, *stearin*, and *palmitin*; by the *cholesterin* of bile, blood, and nervous tissue; by the *lactic* and *formic* acids; by *animal glucose*; by *sugar of milk*, &c. The *inorganic* compounds of animals include water—which forms about two-thirds by weight of the human body—phosphorus, sulphur, silica, chlorine, and the other elements already enumerated. The processes of digestion, &c., it must also be remembered, include *chemical* as well as purely *vital* aspects. See DIGESTION, &c. Respiration, or breathing, thus also involves chemical considerations, in the interchange of oxygen and carbonic acid gases, whilst the excretions, or waste-matters of the body, have equally a chemical history of much interest.

Animal Flower. See ACTINIA and ANEMONE.

Animal Functions, the term applied to the function of *innervation*, or that included in the operations of the *nervous system*. This name is used in contradistinction to that of *vegetative* or *organic functions*. These latter consist of the functions of *nutrition* and *reproduction*, and are so named because they are common to both plants and animals; whereas the functions of the nervous system are supposed, in an ordinary sense, to be peculiar to, and to be possessed by, animals only.

Animal Heat is the heat produced by the various chemical and physical processes occurring in the living body. The chief of these are the union of oxygen with the blood in the lungs (see RESPIRATION), the formation of carbonic acid in the capillaries, the oxidation of hydrogen, sulphur, and phosphorus in the

tissues, and the formation of various chemical products during the action of the muscles and nerves. Modern research indicates that no physiological processes occur without the production or absorption of heat. The temperature of the body varies in different species of animals. As a general rule, the greater the activity of the animal the higher is the temperature of its body. The following are the temperatures, in degrees Fahrenheit, of a few well-known animals: Man, 98.4°; the ox, 99°; the sheep, 100°; the horse, 97°; the dog, 99.3°; the cat, 98.6°; the bat, 102°; the gull, 100°; the common hen, 102.99°; the pigeon, 106°; the falcon, 107°; the chaffinch, 107°. It will be seen that the temperature of birds is higher than that of mammals, with the exception of the bats, which have a higher temperature. The temperature of cold-blooded animals, such as toads, frogs, and serpents, is not more than a few degrees above that of the medium in which they live. Warm-blooded animals, on the other hand, maintain a remarkably constant temperature, which rarely varies within the limits of one or two degrees without indicating disease. This occurs although the temperature of the medium in which the warm-blooded being lives may vary through a very wide range. For example, the temperature of man, amidst the snows and ice of the Arctic regions and under a tropical sun, is found to be invariably in health from 98° to 99° Fahrenheit. These facts show that the body has the power of maintaining its temperature uniform, a condition essential to the health of warm-blooded animals. This equalisation of temperature is regulated chiefly by the functions of the skin. When exposed to a high temperature, above 98°, the sweat-glands of the skin secrete a fluid which, by its evaporation, produces a cooling effect. The higher the temperature in an atmosphere not saturated with aqueous vapour, the greater the amount of perspiration converted into vapour. These facts explain how it is that warm-blooded animals are able to live in a temperature much above blood-heat, provided the atmosphere be dry, as in an oven. Cases are on record in which men were able to endure a temperature of from 200° to 220° Fahrenheit for a short time. On the other hand, such a temperature would be unendurable, and would quickly destroy life, if the atmosphere were saturated with aqueous vapour. In these circumstances there would be no evaporation, and the body would become superheated.

The temperature of the body is also, no doubt, regulated to a considerable extent by the equable distribution of warm blood through the body. This is effected by the action of a special system of nerves termed the sympathetic system, which govern the size of the arteries. See SYMPATHETIC SYSTEM OF NERVES.

A. H. has in recent times been studied by the physician and surgeon with reference to the diagnosis and prognosis of disease. The thermometer is now of equal value with the stethoscope. It has been found by careful observation that even a slight permanent increase in the temperature of the body indicates a morbid condition; and if a rise of from 2° to 5° persists, the patient is regarded as being in a very dangerous condition. The explanation of this is, that morbid changes which may elude not only the sensations of the patient, but also all the powers of observation and diagnosis of the physician, are at once detected by the thermometer. The use of the instrument enables the physician to watch the progress of the case. With obscure chest symptoms a permanent rise of 2° or 3° may indicate pulmonary disease. In fever the temperature may rise towards night and abate towards morning, while a rise towards morning would be a sign of grave omen. It is the practice now, in all well-regulated hospitals, and in private life, to have a chart or table by the bedside of the patient, in which the temperature of the patient is recorded four times daily. In fevers, with acceleration of the pulse and respiration, in active consumption, in pyæmia, or poisoning of the blood by putrid infection, and in acute inflammatory diseases, temperatures of 104°, 106°, and even 110° have been noted. On the other hand, in asthma, in which the blood is imperfectly oxygenated in the lungs, the temperature is below 98.4°. In the stage of collapse in Asiatic cholera, the heat of the body may fall as low as 80° or 67°, that is, 15° to 28° below the normal temperature. The approach of death is usually indicated by a fall of temperature, with evaporation of profuse perspiration. It is remarkable that in some cases of cholera and yellow fever the temperature after death undergoes an actual elevation.

Animal Magnetism is a term applied to describe the influence one person may exert over another, controlling his ideas

and actions, which has been attributed to the influence of a particular principle similar to that at one time believed to reside in a magnet. It was supposed to be transmitted from one person to another through the medium of the nervous system, and some went so far as to speak of a magnetic fluid or emanation which existed in large quantity in certain individuals, and which they could impart to others by an effort of will. The existence of any fluid or emanation has never been demonstrated, and the phenomena attributed to its influence may be readily accounted for by well-known psychological processes.

In some circumstances, the mind becomes wholly occupied with one idea or train of thought, to the exclusion of all other considerations. This idea may be so powerful as to prompt to voluntary acts. If this state occur during sleep, it is termed dreaming if movements do not occur, and somnambulism if the impulse be so strong as to cause the individual to speak or to get out of bed and walk about. But similar conditions sometimes exist during waking hours, and are known as the states of reverie and abstraction. In these conditions the order of the thoughts and feelings are not regulated by the will, and are determined either by previous ideational states or by new impressions on the senses. If determined by previous ideational states, the individual is oblivious to external sensory impressions; if by new sensory impressions, the individual may be readily prompted to acts by the suggestions of another. Both of these conditions may occur naturally, and are manifested to a greater or less extent by persons who are, in common language, called absent-minded. But it is remarkable that they may also, in certain persons, be excited artificially. When this occurs, we have the phenomena attributed to A. M., mesmerism, and electro-biology, all terms used to express false theories. See ELECTRO-BIOLOGY, MESMERISM. When a person is in this condition, suggestions whispered into his ear by others are at once followed by corresponding acts. In like manner, suggestions may be conveyed by the other senses. Persons so affected are for the time entirely under the will of the operator, and so intense in some cases is the abstraction, that even painful impressions on the skin are not felt. To this condition the late Mr Braid of Manchester gave the name of *mono-ideism* or *hypnotism*, and he proposed to introduce it into medical practice in cases of sleeplessness, and ~~an~~ to produce anaesthesia, or painlessness, during surgical operations, or as a relief to suffering in painful maladies. It has been found, however, that the cases are comparatively few in number that can be benefited in this way. It is well the public should know that the phenomena of A. M. are purely physiological, and not to be accounted for by any occult principles of fluids or forces. For details regarding these conditions, see *Principles of Mental Physiology*, by William Carpenter, M.D., &c., chaps. xiv.-xvi. (Lond. 1874.)

Animalcules. This name has been popularly applied to indicate all animal forms of small or microscopic size, which are generally found inhabiting water. Zoologically, however, it is important to clearly distinguish between various groups and kinds of small animal organisms. Thus the Infusoria (q. v.) form animalcules of a low type of organisation, and are included among the Protozoa. These exist in immense numbers in fluids or infusions of decaying animal or vegetable matter, and are believed to be therein propagated from their germs or ova, which, borne in immense numbers by the atmosphere, fall into such fluids, and there develop into animalcules. These, again, are to be carefully distinguished from the *Rotifera* (q. v.), or wheel-animalcules, which inhabit the waters of pools, &c. The 'wheel-animalcules' are of much higher organisation than the preceding forms, and are included in the sub-kingdom *Echinozoa* or *Amnolida*. They were, in the early days of microscopic inquiry, classified with the Infusoria, until better microscopes and higher powers showed their superior structure. Included in a heterogeneous manner with the Infusoria, Rotifera, and other small organisms, under the name of 'animalcules,' many Protophyta, or lower plants, many *Algae*, &c., were formerly arranged. But the more careful pursuit of microscopic inquiry has separated out these varied forms, and allocated them to their proper divisions in the animal and plant worlds. The term 'animalcule' can only now be used in a general sense, and as such is never employed in zoology, unless the special kind of animalcule or organism be also designated. We thus speak of *Infusorian* animalcules or of *Rotiferous* animalcules, &c. The Infusoria

are found in a fossil state, and exist in certain formations, along with the remains of *Diatomacea*, *Foraminifera*, &c.

Animals, Cruelty to. In England and in Scotland, injury done to an animal, being the property of any one, has always been held as an offence against the law; but until our own time the injury has been punishable by law solely as an offence against the right of property. It is now recognised that a certain class of animals are entitled to be legally protected from needless pain for their own sake; and in so protecting them, we believe that we are improving the morality, and consequently the happiness, of mankind. By 12 and 13 Vict. c. 92, the over-driving or ill-treatment of any 'domestic animal' renders the offender liable in a fine of £5. A curious question recently arose under this clause of the Act. The keeper of a menagerie was proved to be systematically ill-treating a hyena, and the point was, could a hyena be regarded as a 'domestic animal'? otherwise, it was not protected by the Act. It was contended that though hyenas in general were not domestic, this one, as the inmate of a caravan, was so. The point was not decided. The Act makes a variety of other humane provisions against baiting animals, and causing them to fight, and for their slaughter and conveyance.

Animals, Worship of, a species of idolatry common among some of even the most polished nations of antiquity, and still practised by barbarous tribes. It owes its origin to the mystery which surrounds a form of life differing from the human, to the natural reverence men have for power, and to a desire to penetrate the future, a knowledge of which some animals were supposed capable somehow of communicating. The gods were frequently symbolised by animals, and the doctrine of the Metempsychosis (q. v.) aided in generating and strengthening the idea of animal-worship. Peoples diverging widely in race, locality, and culture agreed in holding kindred notions on this subject. The instance of animal-worship of which we have the fullest details is that of the worship of the bull Apis by the ancient Egyptians. Apis was the emblem of the soul of Osiris, originally a sun-god; and the golden calf of the Israelites was simply a memory of Egypt.

Anima Mundi ('the soul of the world'), a name given by some ancient philosophers to a supposed intelligent, immaterial force, which was the source of all forms of life. In later times, the doctrine merged into Pantheism.

An'ime, a kind of resin obtained from the W. Indian locust-tree (*Hymenaea Courbaril*), which is used as varnish. The name A., however, is also applied to similar resins obtained from different sources.

Anion. See ANODE.

An'ise, an annual plant, called by botanists *Pimpinella Anisum*, belonging to the order *Umbelliferae*. It is cultivated in many parts of Europe for its fruit, which is used as a condiment, and in the preparation of certain kinds of liqueurs under the name of A.-seed. It contains a volatile oil. The plant in all its parts is aromatic. In Italy a beverage is used called A.-water, flavoured with A.-oil. The word *Anethum*, which has been translated A. in the New Testament (Matt. xxiii. 23), appears to be the plant known as Dill (q. v.). Star A. is the fruit of a small tree belonging to the natural order *Magnoliaceae*. See ILLICIAM.

Anjou, a former province of France, with an area of 3080 sq. miles, now forms the department of Maine-et-Loire, and part of Sarthe, Mayenne, and Indre-et-Loire. Its ancient inhabitants were the Celtic *Andegavi*. On the break up of Charlemagne's dream of a Holy Roman Empire, it became a sovereign county, under Ingelger, in the 9th c. In 1060 it passed to the powerful house of Gatinai. One of this family, Godfrey, Count of A., married Matilda, daughter of Henry I. of England, and founded the line of the Plantagenets. His son, Henry II., retained A. as a possession of the English crown; but it was taken from King John (1204) by Philip Augustus of France. St Louis gave it to his brother Charles, who was the founder of the elder house of A., which gave kings to Naples, Sicily, and Hungary. In 1328 it was annexed to the French crown by Philip VI.; but in 1356 King John gave it to his second son Louis, who thus became the founder of the younger house of A. Meanwhile it had been raised from a county to a duchy. After several other

changes, it was finally annexed to the French crown (1474) by Louis XI. The honorary title Duke of A. was long maintained in the royal family; the last who bore it was the grandson of Louis XIV., afterwards Philip V. of Spain. See Kitchin's *History of France* (Clar. Pr. Ser. 1873).

Ankarström, John Jacob, born in 1761, was the son of a Swedish gentleman who had served with distinction in the army. He was first a court page, and afterwards a captain in the king's body-guard. Having been accused of treason, he was discharged in 1783 for want of proof; but he harboured a grudge against his sovereign for harsh treatment dealt him during his trial, and eagerly entered into the designs of that portion of the Swedish nobility who were discontented with Gustavus III. for his attempts to restrict their privileges. The assassination was planned as early as 1790, and was effected by A. on the 15th of March 1792. He was beheaded on the 29th of April, after having been publicly flogged for three days in succession, and never showed any contrition for his crime.

Anklam, a town in the province of Pomerania, Prussia, 44 miles N.W. of Stettin, on the Peene, 4 miles from its mouth. It is connected by railway on the one side with Stettin, on the other with Stralsund and Greifswald. A. is a considerable port; shipbuilding is an important industry; there are also breweries, factories, soap-works, and tanneries. A., which is a very old town, was a member of the Hanseatic League from 1319 to 1638. During the wars of the 17th and 18th centuries it was repeatedly destroyed, and at the end of the Seven Years' War (1762) it was dismantled. With the rest of Swedish Pomerania, it finally came into the possession of Prussia in 1815. Pop. (1872) 11,440.

Ankle. The A. is part of the lower extremity, including the lower part of the leg and the upper part of the foot. It contains a joint, termed the A.-joint. The bones entering into its formation are the lower end of the tibia and fibula, and the astragalus. These bones are firmly united by powerful ligaments. The movements at the A.-joint are those of flexion and extension. A small amount of lateral motion is also allowed in the condition of complete extension, but there is none in flexion.

Ankle, Surgery of. In disease of the bones or soft tissues of the foot, it may be necessary to amputate at the ankle-joint, an operation first executed by Syme. In this operation the bones of the leg are disarticulated from the astragalus, and a soft covering for the stump is taken from the heel. A modification of this operation was introduced by a Russian surgeon, Pirogoff, in which the posterior part of the bone of the heel (as *calcus*) is left in the flap.

Dislocation of the ankle frequently occurs, and is almost invariably connected with fracture of the lower end of the fibula or of the internal malleolus, the lower process of the tibia. The foot may be pushed to either side, forwards or backwards, but the most common displacement is outwards. The dislocation is easily put right by traction into the proper position, and the after-application of leg-splints with lateral foot-pieces. Compound dislocations of the ankle-joint are very serious, and in many cases portions of bone have to be removed before the parts can be brought into proper position.

Fractures may pass through the bones forming the ankle-joint, exciting inflammation. Wounds of the ankle-joint are usually attended by great constitutional disturbance.

Lastly, the ankle-joint may be weak from a relaxed state of the ligaments. In these cases elastic ankle supports, bandages, or even pasteboard supports may be required.

Ankobar, the capital of the kingdom of Shoa, Abyssinia, near the river Habesh, on a tableland 8198 feet above the sea. It is chiefly composed of huts, the only stone building in the town being the royal palace. The court resides here during part of each year on account of the agreeable climate. A. is fortified with a wooden palisade. The adjacent country is densely wooded. Pop. about 10,000.

Ankylo'sis is what is commonly known as stiff joint. It is the result of inflammation which has destroyed the cartilaginous surfaces of the bones or the ligaments connecting the bones together. Nature effects repair by causing the parts to become cemented together, and also produces more or less complete

consolidation of the parts around the articulation. It is of two kinds: the incomplete, in which the capsules or fibrous bands connecting the bones are thickened or shortened, but not to such an extent as to produce absolute immobility; and the complete, in which the osseous surfaces become fused together by direct bony union, so as to render the joint completely immovable. Surgeons do not usually interfere with ankylosed joints, but in some cases the fibrous bands may be divided and the connections forcibly separated. In some cases, amputation may have to be resorted to where the ankylosed joint is inconveniently fixed, resists attempts to put it in a better position, and causes atrophy of the limb.

Ann, or **Annat**, in Scotland, is the right of a minister's executors to one-half the stipend beyond what is due to the estate of the deceased minister; it is divided equally between the widow and children, for whose support it is provided. The minister therefore cannot assign it away by deed or bankruptcy. The feu-duties on which the price of a glebe may be invested form part of A.

Anna Carlovna, Regent of Russia (1740-41), born in 1718, and was the daughter of Karl Leopold, Duke of Mecklenburg, and of Katharina, sister of Anna Ivanovna (q. v.), Empress of Russia. The latter had named as her successor Ivan, son of A., to please her favourite Biron (q. v.), whose object was to secure the regency. This he did, but in a few weeks he was overthrown. A. then proclaimed herself regent, but she proved quite unfit for the position. A conspiracy was formed in 1741 for raising Elizabeth, daughter of Peter the Great and of Catharine, to the throne. It succeeded; and A. and her husband, Anton Ulric, Duke of Brunswick-Wolfenbüttel, whom she had married in 1739, were condemned to imprisonment for life in Cholmogory, a town on an island in the Dwina. Here she died, 18th March 1746. Her husband died in 1780, having been thirty-nine years in prison.

Anna Comnena, daughter of the Byzantine emperor Alexius I., was born 1st December 1083. A brilliant education in eloquence, poetry, philosophy, and mathematics secured her a reputation probably beyond her merits, but to her passion for literature she added a passion for political power. Aided by her mother, the Empress Irene, she endeavoured to induce Alexius to disinherit Calo-Joannes, his eldest surviving son. Failing in this, she formed a conspiracy against the life of her brother, in which her husband Nicephorus Bryennias refused to join. She again failed. Her brother treated her with great magnanimity. He spared her life, and though he deprived her of her property, he soon afterwards restored it to her. Henceforth she contented herself with supremacy over the *beaux esprits* of the imperial court. In 1137 her husband died, when she retired into a convent. Her *Alexiad*, a biography of her father, written in Greek (*Anna Comnena Alexiados, Libri XIX.*), was finished in 1148, and she died the same year. While it professes infinite regard for truth, and to proceed on careful inquiry, the style, which is affected, and the perpetual eulogy of Alexius, hardly sustain these assertions. Nor does the character of A. C. lead us to expect from her truth and impartiality. Yet the work is one of the most interesting in the whole series of the Byzantine historians, and is indispensable to a full conception of the first crusade.

Anna Ivanovna, Empress of Russia, born 25th January 1693, was the second daughter of Ivan, the elder half-brother of Peter the Great. In 1710 she married Frederick William, second Duke of Courland, but became a widow in the following year. On the death of Peter II., 19th January 1730, the throne of Russia was offered to her by the supreme council, conditionally on her acceptance of seven articles, which changed the despotism of Russia into a limited monarchy. A. accepted these articles, but shortly after so doing she convoked the senate in her palace, and declared her promises null, as having been fraudulently obtained, and proclaimed herself 'Autocrat of all the Russians.' For some time her policy was humane and peaceful, but having fallen under the influence of her paramour Biron—an avaricious and cruel man—it became quite the reverse. The cruelty and bloodshed attributed to Biron almost exceeds belief. A. died 28th October 1740, leaving the throne to her grand-nephew Ivan under the regency of Biron (q. v.) See ANNA CARLOVNA. Man-

stein, *Mémoires* (Lyon, 1778), and Schtschebalakij, *Wstupleni na Prstol Imp. Anny* (Mosk. 1859).

Anna St., according to tradition, the wife of St Joachim, and the mother of the Virgin Mary, is first mentioned in the writings of St Epiphanius (4th c.); yet already in the 8th c. she was invoked throughout the whole Church, and she still claims a day in the Catholic (26th July) and in the Greek (9th December) calendars. The legend of St A. states that her body was brought from Palestine to Constantinople in 710, and since then many churches boast to have relics of her person. In her honour was founded a religious brotherhood early in the middle ages, which was revived under Jesuit influences after the Reformation, and still exists.

An'naberg, a town of Zwickau, Saxony, on the Sehm, 18 miles S. of Chemnitz by rail. It lies 1800 feet above the sea, and near it are silver, tin, cobalt, and iron mines. A. is famed for its lace and silk ribbons. In the neighbourhood are fine saline springs. Pop. (1872) 11,693.

Annals, the records of one or more years arranged chronologically, a term derived from the *Annales Pontificum*, drawn up at Rome by the Pontifex Maximus, and the subsequent A. of Fabius Pictor. The A. of Tacitus is the first work to which the term is applied in precisely the modern sense. There is a valuable work in the English tongue, commonly called the *Anglo-Saxon Chronicle*, which is strictly annalistic, though not so called.

Annam'aboe, a small seaport on the Gold Coast, Africa, 10 miles E. of Cape Coast Castle. The Ashantees attacked it (1807), and killed two-thirds of the inhabitants. It is protected by a British fort, and the gold trade, the only industry of the place, is on the increase. Pop. about 5000.

An'nan, a seaport town and royal burgh in Dumfriesshire, on the river A., about a mile from its entrance into Solway Firth. It is a place of great antiquity, and was the residence of the Bruce family. The town is well built; its environs are studded with villas; and the river, here spanned by a bridge, is celebrated for salmon-fishing. The chief industries are cotton-weaving, tanning, and bacon-curing. A. is a station on the Glasgow and South-Western Railway, and has regular communication by steamers with Liverpool and Whitehaven. It was the birthplace of the famous preacher Edward Irving. Along with Dumfries, Lochmaben, Sanquhar, and Kirkcudbright, A. returns one member to Parliament. Pop. (1871) 4631.

Annap'olis, a port of entry, and capital of Maryland, U. S., on the Severn, about 2 miles above its entrance into Chesapeake Bay. It was founded in 1649 under the name of Providence, but was afterwards called A., in honour of Queen Anne. It contains several handsome public buildings, and is the seat of St John's College, founded in 1787, and of the U. S. Naval Academy, established 1845. It is connected by railway with Baltimore and Washington. Pop. (1870) 7363.

Annap'olis, a small seaport of Nova Scotia, lies in a fruitful region of the same name on the Bay of Fundy. It was founded as Port Royal by the French in 1604, and is therefore the oldest European settlement on the mainland of N. America. In 1713, along with the rest of the province, it passed into the hands of the English, when it was called A. in honour of Queen Anne. A. was the capital till 1750, when the seat of government was removed to Halifax. Since then it has declined. Pop. (1870) about 500.

Ann Arbor, a town of Michigan, U. S., on the Huron river, and a station on the Michigan Central Railway, 38 miles W. of Detroit. It has a flourishing trade in agricultural produce and implements, but is chiefly notable as the seat of the State University, founded in 1837, and which has attained a high reputation. Pop. (1870) 7363.

An'notes, or **First-Fruits**. The fruits of a benefice during the first year of occupancy were for many centuries claimed by the Pope on presenting to bishoprics and abbeys, and latterly also from the inferior clergy. In England protests were frequently made, and in the reign of Edward III. the Pope offered to compound for an annual tax of one-twentieth. By the Statute of Recusants (25 Hen. VIII. c. 20, and confirming Act), the right to A., and also to tenths (an annual tax exacted from all livings by the Pope), was vested in the king and his successors.

the Pope having been deprived of his right to present by Bull. A valuation of all benefices was also made by Henry. By 2 and 3 Anne, c. 11, both A. and tenths were vested in the governors of the Bounty of Queen Anne for the augmentation of the maintenance of the poorer clergy. The collection of this fund was reformed by 1 Vict. c. 20. The annual income from A. and tenths is between £15,000 and £16,000; but from a parliamentary grant fund, amounting to above a million, invested savings, and sums received in trust from private benefactors, the governors are able to pay more than £100,000 *per annum* to the clergy. Benefices under £50 *per annum* in value are exempted from A.; and where the estates of holders of dignities, prebends, and offices are vested in the Ecclesiastical Commissioners, one-twentieth of the annual value is paid in lieu of A. and tenths. The governors augment in sums of £200 of capital, not by annual payments. Augmented curacies are declared perpetual. A private contributor to the augmentation often becomes patron. The governors have advanced large sums for the endowment of new churches in populous places on the security of the property vested in the Ecclesiastical Commissioners under the Cathedral Acts, and in loans under Gilbert's Acts. In Ireland, A., formerly payable to a Board of First-Fruits, and applied to augment stipends and repair churches, were in the shape of an annual tax transferred in 1833 to the Ecclesiastical Commissioners. Under Mr Gladstone's Act, the Commissioners of Irish Church Temporalities have recovered considerable sums advanced for erecting glebe-houses.

Annatto, another name for the red colouring-matter called Anatto (q. v.)

Anne, Queen of Great Britain and Ireland, was born 6th February 1664. She was the second daughter of James, Duke of York, afterwards James II., and of Anne Hyde, daughter of Lord Chancellor Clarendon. In 1684 she was married to Prince George of Denmark. She bore seventeen children to Prince George, but only one, the Duke of Gloucester, survived infancy, and he died in 1700 in his 12th year. On the duke's death, Parliament passed the Act known as the Act of Settlement (q. v.) Under it A. succeeded to the throne, on the death of William III., on 8th March 1702, she having, with her father's permission, been educated in the principles of the Church of England. To these principles she was ever steadfast. Even her father's offer, after his accession, to prefer her in the succession to her elder sister Mary, on condition of her joining the Church of Rome, did not cause her to waver. Nevertheless, the character of A. was essentially weak, while few English sovereigns have been placed in circumstances in which firmness was more required. When the Prince of Orange landed, natural affection led her to join her father, whose favourite daughter she was; but Lord and Lady Churchill decided otherwise for her. During the War of Succession (q. v.), waged by England, the Empire, and Holland against France and Spain, A. and her court were under the rule of the celebrated Sarah Jennings, Duchess of Marlborough, and of the still more famous Duke of Marlborough. The duke's splendid victories dazzled the nation, long blind to the fact that they were barren so far as England was concerned, and bought at an enormous price. A much more important achievement in the reign of A. than the victory of Blenheim, though comparatively little thought of at the time, was the capture, during the same year (1704), by Sir George Rook, of the fortress of Gibraltar. Tired of the Marlboroughs, A. took refuge in a new favourite, a Mrs Masham, whom the Duchess of Marlborough had herself brought into the queen's household. Mrs Masham, coalescing with Henry St John, Lord Bolingbroke, and other Tory leaders, effected a change of government in 1710. The policy of the new ministry, in which the queen concurred, was to secure the succession to her brother; but the design was frustrated by the internal dissension of the Cabinet, its inability to act in harmony with Mrs Masham, and by the feeling of the nation. A. died 1st August 1714, the last of the Stuart family that occupied the throne of Great Britain. She was succeeded by the Elector of Hanover as George I. If not a great queen, A. seems to have been an amiable woman. Her reign has been made illustrious by the many great men in science and literature who lived under it. Pope, Swift, Addison, are only foremost of the numerous 'wits of Queen Anne's time,' whose exquisite gifts have led some to regard it as the Augustan age of English literature.

Anne of Austria, daughter of Philip II. of Spain, was born 1601, and married to Louis XIII. of France in 1615. Cardinal Richelieu, who cherished a deadly hatred against Austria, by representing that A. conveyed state intelligence to her native country, made the marriage an unhappy one. On the death of Louis in 1643, A. became regent, and chose for her minister Cardinal Mazarin, by whose skilful management, and vigorous suppression of the war of the Fronde, Louis XIV. mounted a firmly-established throne. She died 20th January 1666. A.'s temper was cold, her disposition grave, and her skill in the choice of instruments unerring.

Annealing is the process by which the brittleness of glass is lessened after it has been manufactured. The same process is also applied to certain metals after they are melted and suddenly cooled, or when they have been submitted to a heavy blow or long-continued hammering. The tempering of steel is also essentially a process of A. The process consists in inducing a very gradual cooling, and to effect this in the case of glass, the material has first to be raised to a high temperature. The sheets of glass or glass vessels to be annealed are placed in the A. oven, or 'lier,' which is a long chamber highly heated at the one end. They are gradually moved forward from the hot towards the cooler end, and so allowed to cool in a gradual, uniform manner. A process for the A. of glass has recently been made public by M. de Bastie, by which it is affirmed that the material acquires a remarkable toughness without injury to its transparency. It consists in heating the glass to redness and cooling it in oil, and by this means, it is said, the breaking-strain is three or four times what it would have been if the glass had been annealed by the ordinary process. A. has to be resorted to in the process of wire-drawing, stamping of medals and coins, and boiler-plate rolling; and iron castings softened by A. are called malleable cast iron. The effect of A. depends on the fact that the molecules composing a solid body, which has been highly heated or molten, and allowed to cool suddenly or irregularly, do not assume their most stable position in relation to each other. If the rate of cooling be slow, however, the molecules so dispose themselves that the body, when restored to its original temperature, is capable of resisting the maximum strain without fracture.

An'necy, a town in the department of Haute Savoie, France, has a beautiful situation on the Lake of A., 21 miles S. of Geneva. It belonged during the middle ages to the Counts of Geneva till the extinction of that family, when it was united to Savoy. With the rest of Savoy, it was transferred to France in 1860. Near it is Old A. (*An'necy-le-Vieux*), now a mere village, from which in the 12th c. it was distinguished by the name *Novum Annesium*. The chief buildings are the ruined chateau of the old Counts of Geneva, and the cathedral where are preserved the remains of St Francis de Sales. A. has considerable manufactures of linen, cotton yarn, glass, and sulphuric acid, and its bleach-fields date from 1650. In the vicinity are three remarkable 'ice-caves' or subterranean *glacieres* of large dimensions. Pop. (1872) 9097. Lake A. is 9 miles long and 2 broad, and is overshadowed by magnificent hills.

An'nelida, the representative class of the *Anarthropoda* or lower annulose animals, represented by the four orders of true *Worms*. This group corresponds to one division of the Linnean class *Vermes*. The body is elongated, and consists of a series of somites, or segments arranged along a longitudinal axis. No articulated limbs exist as in insects, &c., but the higher annelides are provided with bristles or setae attached to the sides of the body-joints, and by means of which the body is supported during locomotion. The blood is red or greenish in colour. A distinct head may be wanting. A system of vessels (*pseudo-haemal system*) exists, which circulates fluid throughout the body, and is connected with the breathing processes in these forms. The first order, *Suctorior* or *Hirudinea*, is represented by the leeches, &c. The second order, *Oligochaeta* or *Terricola*, includes the earth-worms and river-worms. The third order, or *Tubicola*, includes the *Serpula*, *Terebella*, &c., which make tubes to protect their bodies; and the *Errantia*, forming the fourth order, are represented by lobworms, aphrodites or sea-mice, and other marine forms. The last two orders breathe by gills, and are termed Branchiate annelides.

Annonay (anc. *Annoneum*), a town in the department of Ardèche, France, 37 miles S. of Lyon. It lies picturesquely at

the confluence of the rivers Deaume and Canoe. First mentioned about the close of the first crusade. It soon after became the capital of a marquisate, and was, as early as the 14th c., noted for its parchment manufacture, which, after the invention of printing, was changed to paper. It has still extensive paper-mills, which produce 300,000 reams yearly. Its other manufactures are chiefly silk, cotton twist, kid-skins, and woollens. Much silk is produced in the vicinity. The two famous inventors Montgolfier were born here. Pop. (1872) 15,052.

Annual, applied in botany to those plants which flower and fruit the same year they are raised from seed, and then die. Many very showy annuals are cultivated in our gardens.

Annual Register, a yearly record of public events, first published in 1759, and continued down to the present time. It was projected by Robert Dodsley, the bookseller, and for many years Edmund Burke was one of the chief contributors. Indices to the work have appeared at various times, and the whole forms a valuable historical repository. Similar publications had preceded the A. R., of which the principal were Boyer's *Political State of Europe* (1711-39), the *Historical Register* (1716-38), and Edward Cave's *Gentleman's Magazine*, begun in 1731. The *Edinburgh A. R.* (1808-27), a rival work, numbered Sir Walter Scott and Southey among its contributors. In Paris the *Annuaire Historique* (1818-49) was superseded by the present *Annuaire des Deux Mondes*. There is an *American A. R.* published at New York.

Annuals were a series of expensive and luxurious gift-books for Christmas, New Year, and birthdays, which appeared in considerable number during the first half of this century. The *Literary Souvenir*, the *Keepsake*, the *Book of Beauty*, the *Forget-me-not*, were the most successful. The last of them, the *Keepsake*, expired in 1856, but since then the name has been revived in Beeton's *Christmas Annual*, which for twelve years has had great popularity. It is the property of Messrs Ward and Lock, Mr Beeton being now simply editor.

Annuity. A certain sum of money paid to any one yearly, or at the end of a fixed period, is, in the wide sense of the word, an A. Usually, however, when we talk of an A., we mean to denote an income which is not derived from the possession of capital. Thus, if a man invests in his own name £1000 at 5 per cent., we should say this gave him an income of £50 a year. If, however, he give his £1000 to another, on condition that he is to receive £70 or £80 for so many years, or for life, we then speak of the return so derived as an A. Annuities are of many kinds. They may be perpetual, descending to heirs; they may be for life, or for a limited number of years. Then there are *deferred* annuities, that is, of which the payment does not begin until a stated period after the payment of the consideration; there are *survivorship* annuities, such as an A. payable to B on death of C, or an A. payable to B or C on death of the first; or *contingent*, as payable to B provided he survive C.

The variety in the nature of annuities is almost endless; and so, consequently, is the nature of the calculations regarding them. These are often very complex; but there are two main elements in them all—the value of money, and the expectation of life. See **ACTUARY**; **LIFE**, **EXPECTATION OF**; **LIFE**, **MEAN DURATION OF**; and **MORTALITY**, **LAWS OF**. By the 'value of money,' we mean the rate of interest which it produces; money being spoken of, commercially, as *cheap* or *dear*, according as the current rate falls below or rises above the mean rate. But for A. calculations it is not the current but the prospective rate that is to be considered; and experience has shown that the only safe way to estimate this is on the data of the past. This is in Great Britain held to be, on real security, 4 per cent., or a fraction above it. Assuming it at 4 per cent., we shall give an example of the mode of calculating the value of a simple, single, life A., this method being the basis of other and much more compendious methods of skilled actuaries. It is required to know the value of an A. of £1, to be paid to B, aged 20. It being understood that all annuities are payable at the end of one year from the date at which they are granted, it is plain that £1 paid for the year's A. would be too much; that is, the value on 1st January 1874, of £1, payable to B on 1st January 1875, is not £1, but the sum which, with interest at 4 per cent., will, in one year, amount to £1. This sum is £0.9615 (see **INTEREST**), or

£0. 19s. 2½d. Nineteen shillings and twopence three farthings would therefore, as nearly as may be, be the value of the first year's A. were B certain to live; but as he is not, we must refer to tables to ascertain the fraction expressing the probability that B, aged 20, will live for one year. Referring to articles cited above, and assuming the probability to be, as it nearly is (certainly being expressed by unity), '986, we have £0.9615 x '986 = £0.9480 = £0. 18s. 11d. as the value of the first year's A. This process being repeated for every year until by the tables age 20 is extinct, and the whole results being added, we shall have the value required. Having got the value of an A. of £1, the value of an A. of any number of pounds can of course be easily found. He who has provision to make for others, or who, from other causes, desires to be thrifty, will find a little study of an A. table well bestowed. It shows to what immense pecuniary results little savings must in time attain. Thus, in thirty years, £1 annually saved, with interest at 5 per cent., will amount to £66.438—consequently £10 a year for the same period will be £664.38.

Annuity, in English law, is a yearly payment of a certain sum of money for life, or a term of years. If payable out of lands, it is properly called a *rent-charge*; but if both the person and estate are made liable, then it is called an A. Under 10 Geo. IV. c. 24, and other statutes, the Commissioners for the Reduction of the National Debt may grant life annuities payable out of the Consolidated Fund, either on one or two lives, or on the continuance of two joint lives, and other kinds of annuities, immediate or deferred, or for a term of years. Annuities granted under the Acts are proportioned to the duration of human life, as ascertained by tables of observation approved of by the Treasury. The purchase is to be made either by the transfer of not less than £100 stock, or by the advance of money, or by the payment of any sum yearly not less than £100. Annuities will not be granted in any case where the Commissioners decline.

In Scotland, as in England, an A. may be charged on real estate by deed, called a bond of A.

Annulet (Lat. *annulus*, a ring), in architecture, is a small ornamental fillet encircling a column, &c. The name was more particularly applied by the ancient architects to the band that girt the capital of Doric pillars.

Annuloidæ, the term applied to the sub-kingdom *Echinozoa*, one of the primary divisions of the animal world. This group is represented by star-fishes, sea-urchins, sea-cucumbers, tape-worms, and other entozoa, and by wheel-animalcules or rotifera. It corresponds in part to the *Radiata* division of Cuvier, the members of which division are now distributed among the sub-kingdoms *Coelenteratæ*, A., and *Annulosa*. The A. possess a radial symmetry, a perfect digestive system; a nervous system exists in all, and a heart and vascular system in most; whilst in all a peculiar system of vessels ramifies through their bodies—the latter being termed the *aquiferous*, *water-vascular*, or sometimes the *ambulacral* system.

Annulosa. See **ARTICULATA**.

Annulus Ovalis, a circular ridge seen on the right side of the septum between the auricles of the heart. It surrounds a depression called *fossa ovalis*; but in foetal life this is pervious, so as to permit the passage of blood from the right to the left auricle. See **FŒTAL CIRCULATION**.

Annunciation, Orders of the. In honour of the A. of the Virgin Mary, one secular order of knights and two religious orders of nuns have been formed. 1. *The Order of Knights of the A.*, instituted in 1360 by Amadeus VI. of Savoy, and in 1720 declared the supreme order in the kingdom. The knights must have previously received the badges of St Maurice and St Lazarus, and be of distinguished rank. The king is grand-master, under whom are a chancellor, secretary, almoner, and treasurer. The decoration is a gold medal, with a representation of the A., the collar composed of alternate love-knots and roses. On the roses are engraved the letters F.E.R.T., the interpretation of which, according to some, is *Fortitudo ejus Rhodum tenuit*, in reference to the brave defence of that island by the Duke of Savoy; according to others, *Frappes, entrez, rompez tous*. Since 1680 the knights have worn on their breasts a star or sun with streaming rays, in the midst of which there is a representation of the A. 2. *Of the Order of Nuns of the A.*

one belongs to France and the other to Italy. The *French* order was founded at Bourges in 1501, by Joanna of Valois, after her separation from Louis XII., for noble maidens of unblemished fame, and was placed by the Pope, in 1517, under the ecclesiastical direction of the Franciscans. It was destroyed at the Revolution, but still possesses houses at Boulogne and Ville-neuve. The *Italian* order was founded at Genoa in 1694, by Maria Vittoria Fornari, in conjunction with a rich friend, Vincenza Lomellini. In its palmiest days it counted fifty houses, mostly in Italy, but some in France and Germany also. It still exists, and has its chief house at Rome. Its surname of the 'heavenly' arose from the sky-blue dress which the nuns wear, and which makes them popularly spoken of in Rome as the *Turchine*, i.e., the 'Violet Flowers.'

An'us Deliberan'di was, in Scotland, the year allowed by law to an heir to make up his mind whether or not he would enter and represent his ancestor; *entry* involving responsibility for the debts of his ancestor. Under statutes of the present reign, however, proceedings may be taken against an heir-apparent to attach the heritable estate of his ancestor six months after the ancestor's death. See **BENEFICIUM INVENTARIL**.

Ano'bium. See **BORER** and **DEATH-WATCH**.

An'ode, the name given by Faraday to the *negative* electrode, the *positive* being called in contradistinction *cathode*. The substance given off during Electrolysis (q. v.) at the A. is termed the *anion*, and the other product of the electrolytic action the *cathion*.

An'odon, a genus of Lamellibranchiate mollusca, included in the family *Unionida*, or that of the fresh-water mussels, in which the shell is generally equivalve, the outer ligament of large size, and the foot also of large size and of compressed shape. Of the anodons, or 'pond mussels,' as they are popularly called, examples occur in the rivers and lakes of Siberia, N. America, and Europe. Many species are known, the 'swan mussel' (*Anodonta cygnea*) being a familiar form. Other species comprise the *A. angulata*, *A. ensiformis*, *A. anserina*, *A. magnifica*, &c.

Ano'dynes, substances which, when applied externally or introduced into the body, relieve pain. When applied externally, they act by diminishing the sensibility of the nerves of the part, which, during pain, is excited to a greater degree than normal. This is the effect produced by liniments of opium or belladonna, or aconite. But as all sensory impressions which give rise to feelings of pain are conveyed to the brain, it is evident that if we diminish the sensibility of that organ by remedies which act specially on it, we may relieve pain. Accordingly we find that all substances which lower the sensibility of the brain are A. See **ANÆSTHESIA**.

Anointing. See **CHRISM**, **CORONATION**, **EXTREME UNCTION**.

Anomalis'tic Year is the time of revolution of a planet or satellite from either apse to the same again. Owing to the continual though slight variation in the position of the apse, this year, in the case of the earth, is twenty-five minutes longer than the tropical year.

Anom'aly (Gr. *anomalía*, irregularity) of a planet at any instant is the inclination of the line joining the perihelion apse and the focus to the radius vector at that instant. The problem of finding the true A. is one of considerable difficulty, and is known as Kepler's Problem, from the circumstance of its having been first proposed by Kepler.

Anomu'ra, a section of the Decapodous order of Crustaceans, which order is represented by the familiar crabs, lobsters, shrimps, &c. The A. are represented by the 'hermit,' or 'soldier' crabs, and their allies, these forms being distinguished by the soft nature of the abdomen, which is generally unprotected by a shell, and which does not terminate in a tail-fin, such as that possessed by the lobsters. The sponge-crabs (*Dromia*), the tree-crabs (*Birgus*), crab-lobsters (*Porcellana*), &c., are also familiar members of the Anomorous section.

Anona and **Anona'ceæ**, a genus and order of Dicotyledonous, Thalamifloral plants. They are trees or shrubs found chiefly in tropical countries. There are upwards of 30 genera

and 300 species in the order. Their properties are generally aromatic and fragrant; some are bitter and tonic, and others yield edible fruits. *A. reticulata* yields the Custard-Apple (q. v.), *A. squamosa* the Sweetsop (q. v.), and *A. muricata* the soursop of the W. Indies. A well-known Peruvian fruit called Cherimoyer (q. v.) is the produce of *A. cherimolia*. Ethiopian pepper is the fruit of *Xylopia aromatica*, a plant belonging to the order, as does also *X. glabra*, the bitterwood of the W. Indies, and *Duguetia guilarensis*, the lancewood of coachmakers.

Anon'ymous (Gr. nameless), applied to any book or writing to which the author has not affixed his name. To one bearing an assumed name the title applied is *Pseudonymous*. There is a French dictionary of A. and Pseudonymous works by Barbier (Paris, 1822-1825), but a similar work in English is still a desideratum. Political writing is, in Britain, usually A.; but of late it has become common for the writers of periodical criticism to adhibit their names to their articles.

Anoplothe'rium, an extinct genus of Ungulate or Hoofed quadrupeds, connecting the ruminants and swine, the fossil remains of which are found in the Lower Tertiary rocks. The *A. commune*, from the Eocene Tertiary formations, is a familiar form. The body was slender, the tail being elongated. The feet had each two hoofs, and rudimentary hoofs were occasionally developed. The dental formula showed six incisors, two canines, eight premolars, and six molars in each jaw. There was no break or interval between the molar and canine teeth. The A. forms the type of a special family included in the Omnivorous section of the Artiodactyle Ungulata. Other genera included in this family are the *Xiphodon*, also from the Upper Eocene formations; *Dichobune* from the Middle Eocene; and *Chalicotherium* of the Miocene rocks, &c.

Anoplu'ra, an order of lower or Apteroous (wingless) insects represented by the various kinds of lice. See **LOUSE**. Cuvier called them *Parasita*, from their parasitic habits.

Anos'mia, insensibility to odours, or loss of smell. This condition may be congenital or acquired. When congenital, it is due to some defect in the olfactory apparatus which cannot be remedied. When acquired, it is caused by repeated inflammations of the mucous lining of the upper chambers of the nose which contains the terminal apparatus of smell. Severe catarrhs, inflammations, the excessive use of snuff, the application of irritant vapours, such as ammonia, may cause A.; and it has also been observed in some cases of brain disease.

Anot'to, or **Arnotto**, a fine red-colouring substance, obtained from the pulp surrounding the seeds of the tropical tree *Bixa orellana*. It is extensively employed in giving a tinge to cheese, and has become an article of considerable mercantile importance, in the form of cakes and of fluid, in all the dairy districts of the United Kingdom.

Anou'ra, an order of the class *Amphibia*, including the frogs, toads, and their allies, in which the tails, with which the tadpoles or larvae are provided, disappear on the animals attaining maturity; thus leaving them in an 'anourous' or 'tailless' condition. They are also destitute of gills in adult life, although, like all other amphibia, they possess these structures in the early period of their existence; and they thus breathe exclusively by lungs in their mature state. Two pairs of limbs are invariably present. No scales are developed. Teeth are developed in a few instances only, and are then of small size. Three families are included in this order. The first is that of the frogs (*Ranidae*); the second includes the toads (*Bufonidae*); whilst the third is that of the *Pipidae*, which is represented by the Surinam toads and their allies.

An'quetil-Duper'on, **Abraham Hyacinthe**, an enthusiastic, though far from accurate, Oriental scholar, born at Paris, 7th December 1731. He studied theology for some time, but soon selected the field of Oriental languages, and after acquiring a fair acquaintance with Hebrew, Arabic, and Persian, he set out for India. Settling at Surat, among the Parsees or fire-worshippers, he became intimate with their *destours* or priests, was initiated into the doctrines of Zoroaster, got possession of some of his books, and returned to Europe in 1762 with a valuable collection of one hundred MSS. His *Zend-avesta*, in 3 vols., appeared in 1771. It contained a translation of several of the

sacred books of the Parsees, and attracted much attention from its introducing Europeans to authentic records of an ancient and interesting theology. Among his other works are *Legislation Orientale*, 1778; *L'Inde en Rapport avec L'Europe*, 1790; and *Oupnekhat*, 1804, consisting of extracts from the Vedas. He died at Paris, 17th January 1805.

Anselm, St., one of the earliest and greatest metaphysical theologians of the middle ages, was a native of Italy, and was born at Aosta, in Piedmont, in 1033. After a dissipated youth, he was drawn by the fame of Lanfranc (q. v.) to the monastery of Bec in Normandy, and in 1060 became a monk of the order of St Benedict. Three years later he was chosen prior, and in 1078 abbot of Bec. His tenderness, humility, earnestness, and prudence in dealing with the sins and frailties of the brethren proved the sincerity and the depth of his own repentance. In 1093 he succeeded Lanfranc in the archbishopric of Canterbury, but hardly a year had elapsed when he came into collision with the brutal and truculent William Rufus. The first cause of quarrel was a refusal on the part of the prelate to give the king as much money as he wanted for his expedition to Normandy to seize the dominions of his brother Robert; the second was his opposition to the acknowledgment of the anti-pope Clement III., who had been recognised by almost all the English bishops. After a brief reconciliation, the hostility of Rufus broke out afresh, and A. with difficulty obtained permission to leave the country in 1097. He went to Italy, and was received at Rome with the highest consideration. On the death of Rufus he was recalled to England by Henry I.; but difficulties soon arose regarding the right of investiture, and in 1103 he once more left for the Continent. By the friendly intervention of Adela, Countess of Blois, he was reconciled to Henry at the abbey of Bec, resumed his archiepiscopal seat in 1106, and died some three years after, on the 21st of April 1109. A. is justly regarded as the Augustine of the middle ages. He was superior to all his contemporaries in sagacity of mind and dialectical ability, and equal to the most eminent in virtue and piety. Profoundly conscious of the necessity of a religious philosophy, he strove to vindicate before the bar of reason the great Christian ideas that pervade the Augustinian theology. His most notable works are his *Monologium, sive Exemplum Meditandi de Ratione Fidei*, in which he seeks to systematically unfold the knowledge of God and of divine things on rational principles; his *Proslogium*, otherwise entitled *Fides quaerens Intellectum*, in which he proposes to demonstrate the existence of God by the idea of divine perfection, the first instance in history of the famous *a-priori* argument; his *Cur Deus Homo* and his *Concordia Prædestinationis*, which made an epoch in Christian philosophy, and the influence of which is still powerful in the sphere of Christian thought. Besides these, he wrote numerous other treatises, which it is unnecessary to specify. The principal editions of A.'s works are (1) that by Picard (Paris, 1610); (2) that by the Jesuit Raynault (Lyon, 1630), who divides the writings of A. into four classes—*Didactica, Ascetica, Parænetica*, and *Notha*; (3) that by Gerheron (Paris, 1675), in which the previous editions are carefully revised, and some fresh epistolary material added. A.'s life was written by his friend and secretary Eadmar, a monk of the Benedictine order. See Lingard's *History of England*, Ampère's *Histoire littéraire de la France*, Haureau's *De la Philosophie Scolastique*, Frank's *Anselm von Cantorbery* (Tüb. 1842), Hasse's *Leben Anselms* (Leipzig, 1843), and Remusat's *Saint Anselme de Cantorbery* (Paris, 1854; 2d ed. 1868). His character and work as a Churchman and thinker are finely portrayed by J. R. King in his *Short History of the English People* (Lond. 1875).

Anser. See DUCK and GOOSE.

Ansgar (Lat. *Ansharius* or *Anserius*), surnamed the Apostle of the N., was born in Picardy in 801, and educated at the monastery of Corbie, not far from Amiens, whence he passed in 822 to Corvei, in Westphalia. His first missionary visit to the N. was in the train of Harold, the newly-converted King of Denmark; his second was to the court of Björn, King of Sweden, who gave him permission to preach the gospel in his dominions. A. and his companions were crowned with success. In 832, Pope Gregory VII. appointed him legate of the Holy See, and first Archbishop of Hamburg. On the destruction of this city by the Norsemen in 845, A. took refuge in Bremen. In the reign of Eric he again visited Denmark, and by his pious energy restored life and purity to the feeble and disordered Church. His subsequent labours in

Sweden were no less successful, and, covered with the glory of his conversions, he returned to Bremen, where he died, February 3, 865. The biography of A. has been written by St Rembert in Mabillon's *History of the Benedictines*, and in Langenbeck's *Scriptores Rerum Danicarum Medii Ævi*. See also Kruse's *Lebensbeschreibung A.'s* (Hann. 1824), and Klippel's *Lebensbeschreibung des Heil. A.* (Brem. 1845).

Anson, George, Lord, Admiral, born of a good family at Shugborough Manor, Staffordshire, in 1697, served as volunteer in the *Ruby* in 1712, and as second lieutenant in Sir George Byng's expedition (1718) to Sicily (which crushed the ambition of the King of Spain in the Mediterranean), and was promoted commander in 1722. A. obtained the command of a fleet commissioned to act against the Spaniards in the Pacific in 1739, and, after an absence of nearly four years, during which time he performed his celebrated *Voyage Round the World*, adding much to geographical knowledge, and capturing a rich Spanish galleon, he returned to receive the highest honours of his profession. In 1747, after having captured six French men-of-war and four richly-laden East Indiamen, he was raised to the peerage. Promoted admiral, and placed at the head of the Admiralty in 1757, he died, 6th June 1762, at Moor Park, Herts.

Anspach, or **Ansbach** (formerly *Onolzbach*), the capital of Middle Franconia, Bavaria, at the confluence of the Holzbach and Upper Rezat, 25 miles S.W. of Nürnberg. It was formerly capital of the *principality* of A., and still contains the deserted palace of the old Markgrafs of Brandenburg. Its chief manufactures are half-silken fabrics, cotton stuffs, tobacco, pottery, playing-cards, whitelead, and cutlery. A. is the birthplace of the poets Cronegk, Uz, and Count Platen, to the latter of whom a monument was here erected in 1859. Pop. (1872) 12,635. A., which owes its origin to a religious establishment of the 8th c., passed in 1288 to the Counts of Oettingen, and in 1331 to the Burggrafs of Nürnberg.

The *principality* of A., originally part of the Rangau, and peopled by a Slavic race, was given in 1474, by Albrecht Achilles, Elector of Brandenburg, to his second son Friedrich, the founder of the Frankish line of the Markgrafs of Brandenburg, who were again divided into the lines of Anspach and Baireuth. The last Markgr. of Anspach-Baireuth sold his state to the King of Prussia in 1791, who was compelled by Napoleon to surrender it to France in 1806. It then went to Bavaria, to which it still belongs.

Ant. Under this designation, popularly used, two distinct kinds of insects are included. The first of these is represented by our ordinary British ants, and those familiar to the inhabitants of temperate climates generally. These are Hymenopterous insects, and are included in that order along with the bees, wasps, and other and allied forms. The second kind of ants are the Termites or white ants of tropical climates, and these latter belong to the Nemoptera—an order of insects represented by the dragon-flies, may-flies, and similar forms. Like the ordinary and common ants, the Termites exhibit a social life, and show many wonderful and interesting traits of instinct and habits; but in structure and zoological position they differ from their more familiar neighbours.

The familiar ants (*Formicidae*) exist in communities, which consist of three kinds of individuals—males, females, and neuters, the last being either sexless individuals, or undeveloped females. The neuters in some species are divided themselves into two classes. The first of these includes the 'workers,' on whom devolve all the duties connected with the formation of the nest, with its repair, and with the care and upbringing of the young. The second class of neuters comprises the 'soldiers,' the sole office of which is to defend the colony, for which function they are provided with large jaws or 'mandibles.' The male and female ants possess wings, the neuters being wingless. The former two groups pair in autumn, after quitting the nest. The females are then impregnated, and lose their wings, and set about the task of founding fresh colonies from the eggs they deposit. The males die after impregnating the females. The females are the larger of the three kinds of individuals, and in



Ant (*Formica rufa*),
Male and Female.

some cases (as in the genera *Myrmica*, *Atta*, &c.) possess stings. Other species possess glands wherein a peculiar acid (formic acid), also found in nettles, is elaborated. This fluid possesses an acrid or irritating effect upon man and lower animals, and is employed doubtless as a means of defence by the A. The neuters also possess stings, and these latter individuals are so developed or formed, probably from a difference of food with which they are provided in their young or larval state. The larvae that are to become males or females are thus fed on a food different from that supplied to the neuter larvae.

The remarkable instincts of ants have long formed topics of interest to naturalists. Although modern zoology has seen reason to doubt or dispute much that has been alleged of these insects, yet their reputation has in no way suffered from the curtailment of some of the statements of earlier observers. Thus certain ants (*Atta providens*, *A. barbara*, and *A. structor*) are known actually to store up grain, as stated in Solomon's well-known admonition to the sluggard; whilst other kinds are known to capture the young of different species, and to train up their captives as actual slaves, on whom the performance of the menial work of the hive devolves. *Formica rufescens* is thus a slave-making species; as also is *F. sanguinea*. Most ants also 'milk' the little *Aphids* or plant-lice—so common in our bushes and shrubs in the summer season—for the sake of the sweet liquid which the aphides secrete in a glandular structure situated in the abdomen. And by some naturalists, certain ants are alleged actually to keep the aphides within their nests, after the fashion of 'cows,' for the sake of this sweet secretion.

The nests of ants are constructed in various ways and of various materials. They are most commonly formed under the ground; the site of each being indicated by a little mound or hillock—the 'ant-hillocks' of the peasantry. Internally, the nest is divided into compartments or chambers of various kinds and sizes, connected by galleries, and appropriated to distinct purposes, such as the storing of food, nurseries for the young, &c. The red or horse A. of Britain (*Formica rufa*) makes the largest hillocks seen in this country. Other foreign species make nests of variable materials and in different situations. The 'mason A.' thus excavates the trunks of trees; whilst others utilise the tissues of plants as building materials. The most familiar genera of true ants are those included under the names of *Formica*, *Atta*, *Myrmica*, *Polyergus*, *Poner*a, &c. Very many species are included under these genera.

The White Ants are described in the article Termites (q. v.)

Antacids. This name is given in *matéria medica* to a number of substances which have the property of neutralising excessive acidity in the stomach, or in the blood, or in the urine. They are the alkalis and alkaline earths, and the carbonates and bicarbonates of these bases. Frequently they are given in practice along with the carbonate or sub-nitrate of bismuth, or with a bitter vegetable infusion. The principal A. in use are magnesia, carbonate of magnesia, lime-water, the carbonates and bicarbonates of soda and potash, and the carbonate and citrate of lithia.

Antæ. See PILASTER.

Antaloides, a Spartan politician and diplomatist. When, some years after the Peloponnesian War, Athens seemed likely to re-establish her power, especially after the destruction of the Lacedæmonian fleet by the Athenian Conon, in the battle near Cnidus, 394 B.C., Sparta changed her foreign policy. From being obstinately Grecian, even to sectionalism, she resolved to sacrifice the control of the sea, and the protectorate of the Greek colonies in Asia Minor, for the sake of a Persian alliance which would secure to her again the hegemony or leadership of Hellas. With this view A. was sent (392 B.C.) on an embassy to Tirabazus, satrap of Sardis, and commander of the Persian forces in Asia Minor, who secretly supplied him with money to equip a navy, till he should have received authority from Artaxerxes to assist him openly. The Persian monarch, however, superseded Tirabazus, and it was not till 388 B.C. that A., now made Spartan admiral in the Asiatic waters, being sent out on a second embassy to Tirabazus, who had been reinstated, succeeded in securing through him the goodwill of the king, who aided the Spartans to force Athens to such a peace as Persia, inspired by Sparta, might dictate. The result was the Peace of A. (387 B.C.) Its three chief conditions were—(1) That the Greek cities

of Asia Minor should submit to the lordship of Persia; (2) that all the other Greek cities, great and small, should be autonomous; (3) that war should be declared against any city which should refuse to accept the conditions. Sparta was charged with the miserable task of seeing the treaty observed. The after-history of A. is obscure; but Plutarch's story that he committed suicide, in consequence of the indignation excited by his dishonourable peace, has not obtained credit. Soon after, Epaminondas destroyed the Spartan hegemony, and in a generation more Alexander the Great shattered in pieces the Persian power.

Antananarivo, the capital of Madagascar, lies in the centre of the island, 7000 feet above the sea, having considerable trade, and a pop. of 80,000. It stands on a hill, which is created by the royal palace and the government buildings. Several churches have been erected here by the London Missionary Society, one of which is a handsome granite structure. The climate is temperate and healthy, but the town is occasionally visited by terrible hail and thunder storms. Great material progress has been made by the people under missionary guidance. The chief seaport is Tamatave, on the E. coast, distant 150 miles. All the roads about A. are wretched, and become mere watercourses in the rainy season.

Antar, or **Antara**, an Arab poet and warrior of the 6th c., whose poems had the honour of being suspended on the gate of the Caaba, and were therefore reckoned among the *Moallakat* ('suspended'). We know nothing of the real A. except that he flourished shortly before Mohammed. His exploits formed the groundwork of the romance named *A.*, committed to writing in the 8th c., and of which a much corrupted version has been preserved. This was rendered into English verse by Terrie Hamilton, secretary to the English embassy at Constantinople, under the title of *Antar, a Bridee; a Romance* (Lond. 1820). In this work A. is represented as the son of an Arab sheik called Cheddad. Unfortunately his mother was a slave, and in spite of his great talents he is long subjected to severe humiliations by those who scorned him for the baseness of his origin. Finally, however, he triumphs over all petty jealousies, is acknowledged worthy to be a chief, and spreads both the terror of his name and the fame of his verse throughout the whole of Western Asia. The moral of the work is the victory of heroic genius over the obstacles of circumstances. It is written in a lofty style, and gives us a splendid and interesting picture of Bedouin life. Among Orientals, the romance of *A.* is almost as much admired as the *Arabian Nights*, and there is not a storyteller who cannot recite some of its numerous episodes.

Antarctic. See ARCTIC.

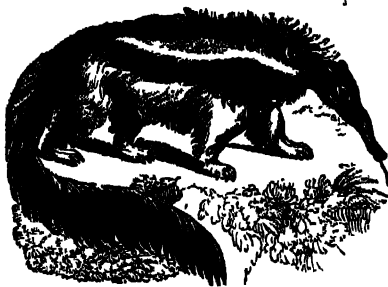
Antarctic Ocean (Gr. *anti*, against; *arctos*, the Great Bear, a constellation of the northern heavens; the ocean opposite the Arctic or north pole), the sea round the south pole. The term is often confined in definition to the sea within the antarctic circle, but it is usually employed in a more extensive signification, as comprising all the sea S. of the Atlantic, Indian, and Pacific Oceans. It is in this sense also called the Southern Ocean.

The A. O. has not been so much explored as the Arctic Ocean. The highest S. latitude yet reached is 78° 4'. Names have been assigned to the following islands and tracts of land within its bounds: Kerguelen's Land, New Georgia, New S. Shetland Isles, New Orkney Isles, Sandwich Land, Enderby's Land, Graham's Land, Adelie, Balleny, Sabrina, and Victoria Land, the last possessing two mountains, Mt. Terror, 10,000 feet, and Mt. Erebus, 12,400 feet in height, the latter being the only volcano known in the frigid zones.

Antares, a star of the first magnitude, marked a *Scorpiōnis* in the catalogues, may be seen from Greenwich at midnight in the beginning of July, situated about 12° above the southern horizon.

Ant-Eater, the popular name of a genus of quadrupeds included in the Mammalian order *Edentata*, and forming examples of the family *Myrmecophagide*. These are the hairy or true anteaters, occurring solely in S. America, and distinguished by the toothless condition of the jaws; by the greatly elongated tongue covered with viscid saliva, by means of which the ants and insects on which they feed are captured; by the hairy body; by the elongated tail; by the strong claws with which the feet are provided; by the toes being concealed and united under the

skin up to the claws; and by the palms and soles of the fore and hind feet respectively being turned inwards so as to adapt the



Ant-eater.

hind-feet five claws. The Tamandua (*M. Tamandua*) is of smaller size, the snout being less elongated than in the former species. *M. didactyla* is another form, which possesses but two toes. *Cyclothorus* is another genus included in this family, of which one species, *C. didactylus*, possesses well-developed clavicles or collar-bones. The scaly A. or pangolin of Africa and Asia is described under PANGOLIN, the porcupine A. of Australia under ECHIDNA, and the Cape A. under ORYCTEROPUS.

Antecedent (Lat. going before), in grammar, the noun preceding the relative, as 'God who made the world,' where God is the A.; in logic, that one of two propositions from which the other is deduced; in mathematics, the first of the two terms of a ratio.

Antediluvian literally denotes whatever existed before the Flood, and is applied to the persons, conditions of society, religious and other beliefs that distinguished the ages before Noah. In geology, however, the A. period has no such limitation, but denotes the period preceding the latest transformation of the earth by the agency of water.

Anteflexion. See ANTEVERSION.

Antelope, a Ruminant animal included in the family *Cervicornia* ('hollow-horned'), to which group also belong the sheep, oxen, and goats. The antelopes are essentially distinct from the deer or Cervide, with which they are frequently confused in a



Antelope.

popular sense. Like those of all the *Cavicornia*, the horns of antelopes are persistent, and are not shed annually as in deer, each horn consisting of a 'horn-core' or process of the frontal bone, invested by a horn-sheath. In a single A. alone—the Prong-buck (*Antilocapra Americana*)—is the horn-sheath shed or cast annually. No incisors or canine teeth exist in the upper jaw, the six lower incisors and two lower canines biting against the hardened gums in the front of the upper jaw. Twelve molars exist in each jaw. The feet present the 'cleft' character of Ruminants generally, and accessory or rudimentary hoofs are also developed. Horns are generally present in both sexes of antelopes. In form, these creatures are deer-like, and usually possess slender legs. A 'beard' or 'dewlap' is seldom developed; and 'inguinal pores,' or glandular structures situated in the groin, together with 'tear-pits' or 'lacrimal sinuses' (sacs existing beneath the eyes), are very generally present in the antelopes. They are usually gregarious, and feed chiefly on grasses. Africa forms the headquarters of the distribution of the antelopes, but they also occur in Europe, Asia, and N. America. In Africa these Ruminants take the place of the true deer or Cervide, which, with the exception of one species, are not represented as natives in that continent. The Chamois (q. v.) (*Rupicapra tragus*) of Europe is a familiar A., and in habits resembles the Rocky Mountain sheep of America (*Haplocerus laniger*), which latter, with the Prong-buck (q. v.) already

mentioned, represents the group in America. The Saiga (q. v.) (*Coelus Saiga*), found in Poland, Russia, and in the European borders of Asia, is a form indigenous to both of these continents, the chamois being the only representative European form. The Chiru (*Pantholops Hodgsoni*) inhabits Thibet and the Himalayas; this species possesses long annulated horns. The Chikara of India (*Tetracerus quadricornis* or *A. Chikara*) is remarkable for the males possessing four horns, two smaller horns being placed below the primary pair. The females of this species want horns. The Nyl-ghau (q. v.) (*Portax picta*) of N. India is of ox-like form, the males possessing horns curved in a lyre-shaped manner.

The common or Indian A., or *Sasin*, is also a familiar Indian species. The Gazelle (q. v.) (*Gazella Dorcas*) or A. of S. Asia and N. Africa are small gracefully-formed antelopes, possessing small black horns. It occurs in large flocks. They are readily domesticated, and are of a gentle disposition. The Spring-bok (q. v.) (*Gazella* or *A. Eucore*), the Bonte-bok (G. or *A. Pygargus*), the Bles-bok (G. or *A. albibrons*), the Kleene-bok (G. or *A. perpusilla*), Blauw-bok (*A. leucophaeus*), and the Riet-bok (*A. arundinaceus*), are all familiar forms of S. Africa. The S. African Water-bok (*Kobus ellipsiprymnus*) is also a well-known species, and derives its name from its habit of frequenting streams. The Klippingspringers (q. v.) (*Oreotragus*) inhabit mountainous districts of S. Africa. The Koodoo A. (*Strepsiceros Koodoo*) of W. and S. Africa possesses horns twisted in a regular spiral manner, the males alone possessing these structures. The Bush Antelopes (*Cephalotophus* or *A. sylvicultrix*) and the Pigmy Antelopes (*C. or A. pygmaea*) are found in S. Africa; the latter species being the smallest of the A. family, and measuring only about 8 or 9 inches in height at the shoulders. The Eland (q. v.) (*Boselaphus orcas*), like the nyl-ghau, resembles the ox in general form. It is the largest of the antelopes, and possesses a 'dewlap.' The Addax (*A. or Oryx nasomaculata*) inhabits N. Africa. The horns are elongated, and slightly twisted in a spiral manner. The Gnu (q. v.) (*Catoblepas Gnu*) resembles the nyl-ghau of India; a second species of this form (*C. gorgon*) also occurring in S. Africa. These forms unite in themselves much of the form of the ox, horse, and A. Very many other species of antelopes are known in addition to those here mentioned. Fuller details of each form are given under their respective headings.

Antennæ, the zoological name for the jointed filamentous processes borne by the head-segments of insects, centipedes, &c., and crustaceans, and which are popularly named 'feelers.' These organs chiefly subserve the sense of touch. Two pairs exist in higher crustaceans, and one pair in insects and myriapods. In Arachnida (spiders, scorpions, &c.), A., as such, are not developed, their place being supplied by the mandibles or large jaws of these forms, some naturalists maintaining that the so-called mandibles of the Arachnida are in reality only modified A.

Antequera (the Roman *Anticaria*), a city in the province of Malaga, Spain, 45 miles W. of Granada. It is picturesquely situated and well built, but lies out of the route of travellers. The inhabitants are chiefly employed in agricultural pursuits, and in the manufacture of baize, silk, flannels, cotton, and paper. A. was taken by the Arabs in 712, and was only recovered by Ferdinand in 1410. The French took it during the Peninsular war, and seized a splendid Moorish armoury belonging to the town. Pop. 30,000.

Anteversion. This is a term used in obstetrical surgery to denote a displacement of the uterus, in which the fundus or upper part of that organ is tilted forward, and the cervix or neck projected backwards. It usually occurs in the unimpregnated condition. Anteflexion is a bending forwards of the body of the uterus on the cervix. In A. the uterus is tilted forwards as a whole; in anteflexion, the organ is bent on itself. Details re-



Indian Antelope.

garding these conditions may be found in Churchill's *Diseases of Women*. Parry & Co. Dublin, 1874. P. 384.

Anthe'lia (Gr. *anti*, opposite; *helios*, the sun) are luminous coloured rings observed round the shadow of the spectator's head when the sun is at a low altitude and the shadow cast upon a dense cloud or fog-bank, or even upon a field of corn or grass bathed in dew. When viewed under very favourable circumstances there are four concentric rings, the inner three being usually coloured, while the outer and very much larger one is of a whitish light. Fraunhofer explains them as referable to the same causes which produce double rainbows, viz., the single and double reflections of a refracted ray in a small globule of water.

Anthelmint'ics are agents which cause the destruction or expulsion of intestinal worms. At least six species of worms infest the human intestinal canal—namely, (1) *Trichscephalus dispar*, or long thread-worm, found in the cæcum and large intestine; (2) *Ascaris lumbricoides*, or large round worm, found in the small intestine; (3) *A. vermicularis*, or small thread-worm, found in the rectum; (4) *Tenia solium*, or common tapeworm, found in small intestines; (5) *T. mediocanellata*, or hook-less tapeworm, found also in small intestines; and (6) *Bothriocephalus latus*, or broad tapeworm, found in the small intestines of the Swiss and Russians. The principal A. are the ordinary purgatives which may remove the parasite; koussou, derived from a plant termed *Bryera Anthelmintica*; santonine, the crystalline principle found in *Artemesia santonicum*; oil of turpentine, obtained from various species of pines; and the oil of male-fern, obtained from the rhizome of *Lastrea Filix-mas*. Santonine is specially adapted for the destruction of the round worms (1, 2, and 3), while oil of turpentine, koussou, and oil of male-fern are serviceable in cases of tapeworm.

An'them (Gr. *antiphone*, a hymn sung in alternate parts), a term applied in England since the Reformation to a species of church music adapted to passages from the Psalms or other parts of Scripture, and resembling the Motet (q. v.) It may be sung by one or two voices, or it may be choral.

An'themis, a genus of Composite plants to which the Chamomile (q. v.) belongs.

An'ther, the case containing the pollen of a plant. See STAMEN.

Antherid'ia, the term applied by botanists to the male organs in Cryptogamous plants. In ferns they are produced in the *Prothallus* (q. v.), and contain bodies analogous to the spermatozooids of animals. See PHYTOZOA. In mosses A. appear on the fully-formed plants. The female organs of cryptogams are called *Archegonia* or *Pistillidia* (q. v.)

Anthol'ogy (Gr. a collection of flowers; Lat. *florilegium*; comp. Fr. *recueil*, a culling or gathering), the name given to a collection of the 'beauties' of literature, chiefly poetical, but sometimes blended with prose. Asiatic and modern European anthologies are often made up largely of extracts from extensive works, but the Greek anthologies were strictly composed of short epigrammatic pieces. We may briefly note the most famous.

1. **Greek Anthologies.** That compiled by Meleager, the Syrian, about B.C. 60, was the first; but it has perished, along with the anthologies of Philip of Thessalonica, who flourished under Trajan, Diogenianus of Heraclea, and Straton of Sardes, both of whom lived in the time of the Antonines; and Agathias. Of the two collections that have been preserved, that of Constantine Cephalas dates from the 10th c., and that of Maximus Planudes from the 14th. The latter, printed at Florence in 1494 by John Lascaris, has gone through many editions, of which the latest, begun by Bosch in 1795, and finished by Lennep in 1822, contains the Latin version of Grotius. In 1606, Salmasius discovered in the Heidelberg Library a MS. of the A. of Cephalas, which he collated carefully with Planudes, making exemplars of the poems not found in the latter. This MS., after being transferred successively to Rome and Paris, was restored to Heidelberg only in 1816. It was edited, with augmentations from various sources, by Brunck at Strasburg in 1776, and re-edited by Jacob at Leipzig (1794-1814). These bright consummate flowers have long been the delight of scholars.

2. **Latin Anthologies.** No Latin A. has come down to us from antiquity, nor is there any tradition of such having ever existed. In modern times, however, collections have been made by scholars out of the remains of the minor poets whose works have been accidentally preserved. The first of these is the one by Scaliger, at Leyden, in 1573; another at Paris, in 1590; a more extensive collection, at Amsterdam, by the younger Burmann (1759-73), of which Meyer published an improved edition in 1835.

3. **Chinese Anthologies.** The most ancient existing A. in the world is Chinese, the *Shi-King* (Book of Songs), a collection, by Confucius, of 311 of the best of the songs that were annually sent to the emperor, as having become popular. It is one of the canonical books of the Chinese. Of this a Latin version was published at Stuttgart in 1830, and a German one at Altona in 1833. Two other collections, the one of poems of the time of the Liang dynasty (502-556 A.D.), the other of poems of the time of the Thang dynasty (618-914 A.D.), are also popular.

4. **Arabic Anthologies.** A collection, in ten books, of songs anterior to Mohammed; the *Divan* of the Hudhailites, and the *Ketab al-aghane* (Book of Songs), with the commentary of Abu'l-Faraj, have all a high reputation; but the best and fullest, and consisting in great part of the later Arabic poetry, is the collection of Taalebi, *Yatimat al-dhar* (the Pearl of the World). Its value has been much enhanced by additions which have been made to it.

5. **Persian Anthologies.** These agree in plan with the Arabic, having biographical notices prefixed to selections, either in the order of time or place, though frequently they are arranged according to the subject, of which the *Madshua al Shuara* (a Collection of Poets) is an instance.

Of the other Asiatic anthologies it will suffice to mention—(1.) The *Tartar*, or East Turkish, and the *Turkish*, or West Turkish, the substance of which is given in Hammer's *History of West Turkish Poetry* (Pesth, 1836). (2.) The *Indian*—i.e., the Mohammedan-Indian—of which the most notable are the *Gulshari Ibrahim*, containing specimens of 300 Hindustani poets, with biographical sketches; the *Guldastai Nishdt* (Garland of Pleasure, Calc. 1836); and the *Guldastai Nâsimind* (Calc. 1845), of which the substance is contained in De Tassy's *Histoire de la Littérature Hindui et Hindustani* (Paris, 1839-47). (3.) The *Sanscrit*. Sarnadhar's *Paddhati*, close of the 14th c., is the only Sanscrit A. proper; but it is very rich, containing 6000 selections from the most celebrated epic, lyric, and dramatic poets, arranged according to the subject.

The collections of modern European nations—English, German, French, &c.—are chiefly intended for popular didactic purposes, and do not require or merit special notice.

An'thony, St. See ANTONY, ST.

Anthony's Fire, St. an erysipelatous disease of a peculiarly pestilential character, derives its name from the circumstance that, when in 1089 it was making numerous victims over the greater portion of France, crowds of pilgrims repairing to the church of La Motte St Didier, in Dauphine, where the bones of St Anthony are deposited, were through his intercession miraculously cured. His help was soon implored over all France. The 'Order of Canons Regular of St Anthony,' instituted in France in 1090, to succour persons labouring under this malignant disease, continued to exist till the year after the great Revolution.

Anthoxan'thum, a genus of grasses. See VERNAL GRASS.

An'thracite is a variety of coal distinguished by its great lustre, hardness, and weight, and chiefly by the fact that when burned it yields little flame or smoke, hence contains more carbon and less bituminous matter than other kinds of coal. A. is found in some parts of Great Britain, in Devonshire, S. Wales, and Ireland, but the largest deposits occur in Pennsylvania. A. was formerly regarded as almost useless, but is now extensively employed in the iron manufacture, and for other purposes.

An'thrax, a term used in surgery for what is known as a carbuncle. A carbuncle consists of severe inflammation of a circumscribed portion of the skin and subjacent tissue, with infiltration of unhealthy adhesive matter called lymph. The swelling is hard, flat, oval, or circular in shape, dull red, acutely tender, or the seat of a throbbing pain. The skin ulcerates at various points, and matter or pus escapes along with shreds of dead connective tissue; this continues until all the dead tissue has

been removed, when healthy action springs up, and the wounds close and cicatrise. During the acute stages of the disease there is great constitutional disturbance—high fever, extreme debility, and mental depression. Occasionally, in aged people, death may result from exhaustion. The treatment is rest, the frequent application of linseed poultices, and free incision with the knife, so as to allow the dead, sloughing matter to come away quickly. At the same time, the patient should be supported by nutritious food, such as beef-tea, or beef-steak and porter; a liberal allowance of port wine is required to support the strength; and tonics, such as quinine, should be freely given. There is no disease in which low diet is more likely to be injurious.

Anthropology (Gr.), the science of human nature, presents itself under two aspects: 1. *Physical A.*, which treats of man in his external relations, as, for instance, his relations to the rest of the animal kingdom; whether he is a distinct creation, or, as Darwin in his *Origin of Species* and *Descent of Man* implies, a development from a lower and simpler organism. In this view of the subject it touches upon and passes into Ethnology, Ethnography, Archaeology, Anatomy, Physiology, and History, &c. 2. *Psychical A.*, which discusses man's spiritual nature, his mental faculties, emotions, moral and religious feelings and aspirations, and thus is closely connected with Æsthetics, Psychology, Theology, &c.

Anthropomorphism (Gr. *anthrōpos*, a man, and *morphē*, form) is the application to God of attributes predicable properly only of men, and springs from the difficulty human beings experience in conceiving of things spiritual otherwise than by a reference to things material. This, primarily a necessity, may lead to error, and to our attributing to the Deity a form, parts, and passions like our own. In the 4th c. the Audeans, a Syrian sect, assigned to God the ordinary human form; and though this notion never prevailed anywhere, there has been much unprofitable speculation about analogous notions. For while Hobbes and Priestley invest God with a body, subtle indeed, but still material, Hegel and Schleiermacher discard his objective personality for the subjective consciousness of him in the human soul, which is really a negative form of A. Our ascribing to God passions and affections results from our conception of him as a moral Governor; and while in one aspect this is natural, there is always a danger of the figurative obscuring the literal.

Anthropomorphous Apes, the name applied to the highest division at once of the *Catarrhine* monkeys, and of the order *Quadrumana*, including the gibbons (*Hylobates*), the orangs (*Simia*), the chimpanzee and gorilla (*Troglodytes*). These forms are thus denominated from their collectively exhibiting the nearest approach to the 'man-like' or human type of structure. See **APES**, **MONKEYS**, &c.

Anthropophagi. See **CANNIBALS**.

Anthus and Anthidae. See **PIBIT**.

Anthyllis, a genus of Leguminous plants. See **KIDNEY VETCH**.

Antiaris, a genus of Artocarpaceous plants. See **UPAS-TREE**.

Antibes, a fortified seaport in the department of the Alpes-Maritimes, France, stands at the point of a peninsula (La Garoupe), about 12 miles S.W. of Nice. It was founded by the Greeks of Massilia (Marseille) under the name of Antipolis, is still in the patois of the spot called *Antiboule*, ranked as an Italian city under Augustus, and has numerous Roman remains, fragments of a theatre, aqueduct, inscriptions, &c. The parish church occupies the site of a temple to Diana. In the 9th c. it was utterly destroyed by the Saracens, but was rebuilt in the 10th, was fortified by Francis I. and Henry IV., stood a three months' siege during the Austrian War of Succession (1746-47), and in 1815 shut its gates against Napoleon on his return from Elba. It has been the seat of a bishop since the 6th c. A. has some trade in olives, fruits, salt fish, and oil; and is famed for the preparation of anchovies. Pop. (1872) 4502.

Antichlore. When chlorine or hypochlorous acid is employed to bleach linen, paper, &c., it is necessary to remove the traces of chlorine which always adhere to the fibre, and which,

unless got rid of, cause the goods to rot. This may be accomplished by long-continued washing, but more easily by dipping the bleached material into a dilute solution of a substance which will combine with the chlorine to form an innocuous compound: such a substance is called A. Formerly, sulphite of soda was employed, but now the hyposulphite is generally used on account of its greater cheapness and superior efficacy. With either of these bodies the chlorine reacts, in presence of water, to form a mixture of chloride of sodium (common salt) and sulphate of soda, neither of which are harmful to the bleached materials.

Antichrist, meaning a power opposed to the Messiah (Gr. *anti*, against, and *Christos*, Christ), has a history dating from the centuries immediately preceding the birth of Christ. The Jewish notions about A., which in their full development are to be gathered rather from the Apocryphal than the Canonical Old Testament Scriptures, can only be understood in connection with those they held about Satan (q. v.) From the time of the captivity much of the Persian Dualism had been adopted by them, though modified by their own conceptions of the Supreme Being. Like the Persian Ahriman, the Jewish Satan was distinguished by hatred of mankind and hatred of God. He had a distinct kingdom, and waged continual war upon men. Still he dared not encounter God himself, but did not fear to resist his servants upon earth. Now, the Messiah was to be the Prince of God's servants, and was to appear in order to establish the kingdom of God upon earth, which was almost entirely in the power of the devil and his angels, so that the 'Prince of this World' would defend his dominions to the utmost against the Messiah. This was the popular belief about A. prevalent among the Jews at the time of Christ.

Regarding the A. referred to by St Paul, 2 Thess. ii. 1-12, so many different opinions have prevailed, that it would be out of place to give any one of them dogmatically here. The epistles of St John, in which the *name* occurs for the first time, merely spiritualise the popular notions about A., and call all who reject the gospel antichrists. The A. of the Apocalypse (the Beast, Rev. xiii.) was the Roman empire, which, in its opposition to the Church, was then regarded as the embodiment of heathenism and ungodly power in the world, and more particularly the Emperor Nero, who was referred to as the head of the Beast whose deadly wound was healed (xiii. 3). There arose soon after the death of Nero a belief that he was not really dead, but had retired beyond the Euphrates, and would return as A. The fact of the prevalence of this belief is clearly testified by the historians of the time; and that this is the explanation of the figures of the Apocalypse is proved by the solution of the *number* of the Beast (xiii. 18), a riddle which has been unquestionably solved only within the last forty years. *Negon Kaiaop* in Hebrew characters is קס"ד, and, according to the Hebrew numerals, 3 (=50) + 7 (=200) + 1 (=6) + 3 (=50) = 306; 3 (=100) + 0 (=60) + 7 (=200) = 360; total = 666.

But at last the Church, instead of being longer exposed to persecution by the civil power, rose to the head of that power, and a proud and degenerate hierarchy was established. Then, strange to say, the language of Paul (2 Thess.) and the figures of the Apocalypse began to be applied to the hierarchy itself by those who, from time to time, were opposed to the pretensions of the Bishop of Rome; and in the 11th c. the idea arose that A. was 'the establishment and growing power of the popedom.' This opinion was held by the Waldenses, the Albigenses, and the followers of Wiclif and Huss, and by the time of the Reformation it had become very prevalent. Since that time it has almost assumed the position of a dogma in the Protestant Church; that is, except with those who regard the fulfilment of the language in question as still future. According to the Roman Catholic Church, A. is the Protestant Church; according to the Greek Church, Mohammed.

Anti-Corn-Law League, an association founded at Manchester, March 20th, 1839, by members of the free-trade party, to obtain the repeal of the corn-laws. As early as 1834 an association had been founded in London for this purpose, but the centre and spring of the movement were in Manchester, where Mr Cobden, by his luminous exposures of the bad influence of restriction on trade and manufactures, rapidly gained numerous and powerful coadjutors. In 1839 delegates were sent from the manufacturing districts to impress their views on the Legislature; and on February 19th, and again on March

12th, Mr Charles Villiers attempted, but without success, to move the House of Commons to inquire into the action of the corn-laws on the interests of trade. This defeat led to the formation of the League on the 20th of the same month. To secure unity of action, the central office was established in Manchester. It was to engage competent lecturers, obtain the co-operation of the press, and establish and conduct a stamped circular for the purpose of keeping a constant correspondence with the local associations. Large funds were placed at its disposal. Gradually some of its most formidable opponents were converted to its views, among them the prime minister, Sir Robert Peel; and the feeling of the country in its favour being at last clearly pronounced, its success was inevitable. This recognition by the country of the truth of one of the most important and beneficial principles of political economy, was owing in great measure to General Thompson's admirable *Catechism of the Corn-Laws*, in which the principles of free-trade were expounded with irresistible logic. Victory was finally achieved in 1846, when Sir Robert Peel carried a measure in the House of Commons for the repeal of the Protective Duties on Corn.

Anticosti (a corruption of the native Indian name *Natiscoti*), an island included in the Dominion of Canada, lies at the mouth of the St Lawrence, N. lat. $49^{\circ} 24'$, W. long. $63^{\circ} 39'$. It has an area of about 2000 sq. miles, and at its S. W. point is a light-house, the keepers of which are almost the sole inhabitants. There are no available harbours, and the interior is marshy and mountainous. A. is chiefly important for its fisheries, and for seal and bear hunting.

Antidote, a substance which counteracts the physiological effects of a poison. Certain antidotes act by precipitating the poison in an insoluble form, so as to prevent its absorption into the blood. For example, chalk-and-water is given in cases of poisoning by oxalic acid, with the view of forming insoluble oxalate of lime. This is a *chemical A.* A second class of antidotes act by becoming mechanically mixed with the poisonous substance, so as to prevent its absorption. Thus, finely-divided animal charcoal is much relied on as an A. in cases of poisoning by alkaloidal substances, such as strychnia. We have here a *mechanical A.* It is evident that both of the foregoing groups of antidotes must be employed at an early stage of the case, while the poison is in the stomach. Both are inapplicable after the poison has been absorbed into the blood. We have, however, a third class of antidotes which may act by neutralising the physiological action of certain poisons, because they exercise an exactly contrary action on the same parts of the nervous or muscular systems as are affected by the poison. This is termed *physiological antagonism*. For instance, strychnia increases the reflex activity of the spinal cord, so that a slight external irritation of any part of the body will at once excite strong spasms or convulsions; but hydrate of chloral has exactly the contrary effect: consequently the one substance is physiologically antagonistic to the other. Another example of the same kind of action we have in the antagonism between atropia and Calabar bean, and morphia and atropia. It is found, however, that this kind of antidotal action is within narrow limits. In a particular case, so much of the physiological A. may be necessary as to endanger life, not by the poison, but by the A. Still, physiological antagonism is now a well-established fact in science, and in such a case as poisoning by strychnia, the only hope of saving the individual would lie in giving large doses of hydrate of chloral, so as to prevent the occurrence of convulsions. A list of the various antidotes placed opposite the respective poisons will be found under POISON.

Antigone. Several persons of this name figure in Greek antiquity.—1. The daughter of Œdipus, by his mother Jocaste, and sister to Eteocles, Polynices, and Ismene. When the blind Œdipus went forth from Thebes, he was accompanied by A., who tended him till his death at Colonus, after which she returned to Thebes. Meanwhile Polynices, having been banished from Thebes by Eteocles, had collected a force, and marched against the city. The result was the death of the two brothers in single combat, the tyrant Creon forbidding the burial of their bodies. A. nevertheless buried the body of Polynices, and for this disobedience Creon condemned her to a cruel death. Sophocles, in his *Œdipus at Colonus*, and *Antigone*, has beautifully embodied in the character of A. the Greek ideal of filial

devotion and womanly heroism.—2. The wife of Peleus, who hanged herself on receiving a false message that Peleus was betrothed to Sterope, daughter of Acæstus.—3. The sister of Priam, who boasted that her hair was more beautiful than that of Hera, and whose hair was therefore changed into snakes; but the gods in pity changed her into a stork.—4. The second wife of Ptolemy Lagus, the founder of the Ptolemaic dynasty, and the mother of Berenice, wife of Ptolemy Soter.

Antigonus, surnamed (according to Lucian) the 'One-Eyed,' the son of Philip of Elymiotis, was born about B.C. 382, and was a general of Alexander the Great. He received the Greater Phrygia, Lycia, and Pamphylia, in the division of the provinces after Alexander's death (B.C. 323). By the authority and help at first of Antipater of Macedonia he made a successful war on Eumenes, ruler of Paphlagonia and Cappadocia, whom he ultimately deposed and put to death (B.C. 316). Seleucus of Syria was also obliged to seek refuge in Egypt. But his ambitious schemes excited alarm in the other generals of Alexander. A coalition was formed against him, consisting of Seleucus, Ptolemy, Cassander, and Lysimachus (B.C. 315), and after a fierce and bloody struggle carried on for years all over Syria, Asia Minor, Greece, and the Levant, A. was defeated and slain at Ipsus in Phrygia (B.C. 301). His son, Demetrius Poliorcetes, was deprived of his Asiatic dominions; but in the civil confusions and discords that marked the time he managed to obtain the kingdom of Macedonia (B.C. 294), which, however, he lost before his death.

Antigonus Gona'tas, son of Demetrius Poliorcetes, King of Macedonia, and grandson of the preceding, is supposed by some to have received his surname from Gonnos or Gonni in Thessaly, presumably his birthplace, and by others from a Macedonian word signifying an iron plate covering the knee. His father died B.C. 283, but six years elapsed before he could obtain his father's dominions. Though twice expelled from his dominions, he finished his reign of forty-four years in comparative peace, dying B.C. 239, aged eighty.

Antigua, a W. India island, the most important of the Leeward Antilles, and the residence of the British governor-in-chief, lies in W. long. between $61^{\circ} 44'$ and $61^{\circ} 58'$, and in N. lat. between $17^{\circ} 2'$ and $17^{\circ} 13'$. Its area is 117,120 acres, of which 100,000 are cultivated. Pop. (1871) 34,344, showing a decrease, since 1861, of 2000. Being surrounded by islets, rocks, and shoals, access to A. is difficult; but the chief town, St John, stands at the head of a large and safe, but shallow, bay. English Harbour is capable of containing the largest vessel. A. was discovered by Columbus in 1493, settled by the English in 1632, and formed into a colony in 1666. Of late years Chinese coolies (there were 100 in 1871) have begun to compete with the freed blacks in the labour market. Its products are sugar, molasses, and rum. The total tonnage of vessels which entered and cleared A. in 1872 was 53,971, of which 49,588 were British. The total value of imports (1872) was £200,757; exports, £128,237, of which the sugar was £119,091.

Antilles, a term generally used to include all the W. Indies except the Bahamas, and so designating a semicircular chain of islands stretching from the Channel of Yucatan to the Gulf of Maracaybo. They lie in N. lat. between $23^{\circ} 8'$ and $10^{\circ} 30'$, and in W. long. between $84^{\circ} 58'$ and $59^{\circ} 20'$.

The *Greater A.*, Cuba, Jamaica, Hayti, and Porto Rico, lie on the N. and E., and have an area of about 70,000 sq. miles. The *Lesser A.*, to the W. and S., consist of a number of small islands, with a joint area of 6500 sq. miles. These are the Virgin Islands, Barbuda, Antigua, St Kitts, Montserrat, Guadeloupe, Dominica, Martinique, St Lucia, St Vincent, Barbadoes, Grenada, Tobago, Trinidad, Margarita, Curaçao, &c. The *Lesser A.* are divided into two sections, the Windward and Leeward Islands—terms, however, very variously used. In British phraseology, the Windward Islands are those of the *Lesser A.* S. of 15° N. lat.; the Leeward Islands those N. of that parallel.

The A. were discovered by Columbus, and soon became of great importance in the trade between Europe and the New World. The origin of the name, which was first applied to these islands by Peter Martyr d'Anghiera in 1493, is uncertain. Some say that it was an application of the vague geographical tradition of the middle ages that far to the westward of the Azores there was an island called Antilla or Antilia; others again suppose that the name is from the Latin *ante*, and denotes the islands that lie in front of the mainland of America.

Antimony is a crystalline metal of white colour, with a slight shade of blue. One of its compounds (the sulphide) was probably known by the ancients, but the metal itself was first prepared by Basil Valentine in the 15th c.

The principal ore of A. is the sulphide, called *stibnite* by mineralogists. This occurs in various parts of the world—in Germany, Hungary, France, America, and Great Britain, and in extensive beds in the island of Borneo.

The metal is obtained from stibnite as follows: The ore is first separated from earthy impurities by fusion; it is then mixed with a little charcoal to prevent caking, and roasted in the bed of a reverberatory furnace. By this treatment most of the sulphur is burned off as sulphurous acid, whilst the oxide of the metal remains. This oxide is moistened with solution of common washing soda (to convert any sulphide of A. into oxide), mixed with charcoal, and heated in crucibles. The carbon of the charcoal combines with the oxygen of the oxide of A. to form carbonic oxide gas, whilst metallic A. remains. A. is sometimes extracted from stibnite by simply fusing it with iron.

Metallic A. is characterised by its extreme brittleness; when struck with a hammer, it splits into fragments, and may be readily reduced to powder. It may be obtained in crystals by fusing it in a crucible, allowing it to cool till a crust forms on the surface, piercing a hole through this crust, and pouring away the metal still remaining fluid: on breaking the crucible, beautiful crystals of the metal are found. A. melts at 450° C., and if heated in closed vessels, may be volatilised. Heated in the air, it burns with a white flame, and is converted into antimonious oxide (or acid). It is not attacked by hydrochloric acid, even though this be concentrated and heated to boiling. Nitric acid oxidises without dissolving it. A mixture of the two acids (*aqua regia*) dissolves it readily. A. takes fire when thrown into chlorine gas, chloride of A. resulting. A. is chiefly valuable on account of its alloys: when fused with most metals, it increases their hardness in a marked manner. Type-metal is an alloy of lead and A., containing from 17 to 20 per cent. of the latter. Britannia metal contains about 25 per cent. The chemical characters of A. resemble those of phosphorus and nitrogen; hence many chemists regard it as a non-metallic element. The atomic weight of A. is 122, and its chemical symbol Sb (from *stibium*, Lat., A.). It forms many valuable and important compounds, used both in medicine and the arts. Of these may be mentioned antimonious chloride, $SbCl_3$, called butter of A.; the oxides, antimonious acid, Sb_2O_3 , and antimonic acid, Sb_2O_5 , the former being one of the ingredients of James' powder; the sulphide or stibnite, Sb_2S_3 , the principal ore of the metal, and largely used in firework-making; tartar emetic, or tartrate of oxide of A. and potash, $C_4H_4O_6K(SbO)$; and the oxychloride of A., $SbOCl$, or powder of algaroth.

Antinomianism (Gr. *anti*, against, and *nomos*, law), the doctrine that faith releases Christians from obligation to observe the moral law. It seems to have manifested itself even in the infancy of the Church: apparent references to it occur in the apostolic epistles: the Gnostics were infected with it; and it has been charged, though probably with much exaggeration, against some of the heretics of the middle ages. The term, however, was first applied by Luther to the opinions of Johann Agricola (q. v.), who in 1537 publicly maintained at Wittenberg that justification by the gospel rendered the law unnecessary. Luther, with the aid of the Elector of Brandenburg, compelled Agricola to retract in 1540. Some English sectaries of the 17th c. held antinomian opinions so extreme that in 1648 Parliament passed severe enactments against them. A. has sometimes been held from erroneous conceptions of Christian liberty; but wherever there is any enthusiasm in its adherents, it has generally passed into practical licentiousness. See ANABAPTISTS.

Antinöus, a youth of Bithynium, beloved for his beauty by Hadrian, whose page he was, and whom he accompanied in all his journeys. He was either drowned in the Nile, or threw himself into the river from disgust at his mode of life, 122 A.D. Medals were struck and temples erected in his honour, and Hadrian rebuilt Besa, in the Thebais, naming it Antinópolis, after his favourite, whom he also ordered to be enrolled among the gods.

Antioch, the capital of the Greco-Syriac kings, was the most famous of the sixteen Asiatic cities founded by Seleucus Nicator, and named after his father. It was situated 20 miles from the sea, in the angle formed by the coasts of Syria and Asia Minor,

and in the opening where the Orontes passes between Taurus and Lebanon. Its harbour, Seleucia, was open to the trade of the W., and through the Syrian desert it was readily accessible by caravans from the S. and E. The original city was built in the plain between the river and the hill, but three other sites were successively built upon and walled in, and the city was hence called a Tetrapolis. The Seleucids adorned the city with the Palace, the Senate-House, and the Temple of Jupiter; and under the empire the Cæsarium, and numerous baths, aqueducts, and porticos, were constructed. The beautiful climate attracted wealthy Roman visitors to this splendid city, the frivolity and vice of whose inhabitants, however, rendered it the most debased even of the Greek cities of the E. The founding of Constantinople deprived A. of its pre-eminence, but it rose to great distinction as a Christian city, ten councils having been held in it between 252 and 380. The peace of the city, however, was frequently broken by internal factions; and the citizens were greatly addicted to ridicule, and to the invention of nicknames. Some think that we have an instance of this in Acts xi. 26: 'And the disciples were called *Christians* first in Antioch,' in which there may lurk a play on the word *Christos* by the suggestion of *Chrestos*, in the sense of 'simpleton.' Whether or not, the propensity to scurrilous banter caused their ruin; for the Persians, who invaded Syria under Chosroes, A.D. 538, took ample vengeance on the Antiochenes for their biting jests by utterly destroying their city. A. was taken by the Saracens in the 7th c., recovered by the Greeks in the 10th, and again taken by the Seljuks, A.D. 1084. The Crusaders under Godfrey besieged and took it, A.D. 1098, and established a Christian principality of A., which lasted till 1268, when it was conquered by the Sultan of Egypt. From the Egyptian Mamelukes it passed into the hands of the Turks in 1516. Since then it has rapidly declined, and the modern Antakieh is a poor town, with a population (1872) estimated at 17,600.—There was another A. in Pisidia (Asia Minor), which is memorable as the spot where circumstances first forced on Paul the conviction that his mission was mainly to the Gentiles (Acts xiii. 46).

Antiochus. Thirteen kings of this name reigned over Syria.—**A. I.** was the son of Seleucus Nicator and Apama, a Persian princess. On his father's murder, B.C. 280, A. succeeded him. **F. I.** A victory over the Gallic horde that broke into Asia Minor, he was surnamed Soter; but in a second battle with them he was killed, B.C. 261.—**A. II.** carried on a long war with Ptolemy Philadelphus, King of Egypt, whose daughter he subsequently married.—**A. III.**, surnamed the Great, made war on Ptolemy Philopator, but was defeated at Raphia, near Gaza, B.C. 217, on which peace was concluded. For seven years (B.C. 212–205) he persevered in an expedition against Parthia and Bactria, which he was unable to subdue; but he established friendly relations with them and with India. On the accession of Ptolemy Epiphanes, he renewed the Egyptian war, and defeated Scopas, near Paneas, B.C. 198. The conquered provinces, however, were given as a dowry with his daughter on her marriage with Ptolemy. A. now commenced his struggle with the Romans. He sustained terrible defeats at Thermopylae, B.C. 191, and at the foot of Mount Sipylus, near Magnesia, B.C. 190. To obtain money to pay the heavy tribute imposed by the Romans, he plundered a temple at Elymais, for which he was killed by the people B.C. 187.—**A. IV.**, surnamed by himself *Epiphanes* (the 'Illustrious'), and by his subjects *Epimanes* (the 'Madman'), inflicted cruelties on the Jews, which led to the heroic rising of the Maccabees, B.C. 168.—In the reign of **A. XIII** Syria was reduced to a Roman province, B.C. 65.—Four kings of this name reigned over Commagene, a small country between the Euphrates and Mount Taurus. **A. I.** was unsuccessfully attacked by M. Antony, B.C. 38. **A. IV.** received his kingdom from Caligula, A.D. 38, and, after a chequered career, was deprived of it by Vespasian, A.D. 72, when Commagene was reduced to a province.—**A. of Ascalon**, an eclectic philosopher of some note, under whom Cicero, who frequently speaks of him in the highest terms, studied when at Athens.

Antipödobaptist, lit. one who is opposed to the baptism of children. It is the correct designation of that sect of Christians commonly called Baptists (q. v.).

Antipöaros, the ancient Ollaros, one of the Cyclades, famed for its stalactitic cavern, 80 feet high, and fully 300 both in

length and breadth. It has been described by several modern travellers, as Tournefort, Leake, Fiedler, &c. A. is 7 miles long, 3 broad, and has 400 inhabitants, who support themselves chiefly by fishing, though corn and wine are produced in small quantities. The only village is Kastron. The existence of the grotto was first announced to the modern world in 1673 by M. de Nohet, French ambassador at the Porte; but in 1806, Colonel Leake discovered in A. a Hellenic inscription containing the names of ancient visitors to the cavern, thus proving that it was not unknown to antiquity, though no mention is made of it in any extant Greek or Roman writer. The stalactitic incrustations are of dazzling beauty.

Antipater, a name borne in ancient times by many who were eminent in war, politics, literature, and science. The best known and most distinguished was A., a favourite general of Philip of Macedon. Along with Parmenion he attempted, but without effect, to dissuade Alexander from his Asiatic expedition till he had settled the succession to the throne by marriage. Appointed regent of Macedonia during the absence of Alexander, he suppressed the rebellion in Thrace, and concluded successfully the war with Sparta. But Olympias, Alexander's mother, disliked A., and in order to avoid the perils of dissension, Alexander ordered A. to come into Asia with fresh troops, while Craterus, who was leading the discharged veterans home, should assume the regency. On the death of Alexander, however, he was reinstated in his office. Being soon after engaged in war with a confederacy of the Grecian states, he defeated their forces at Cranon, abolished democracy at Athens, and caused the chiefs of the popular party, including Demosthenes, to be put to death. Then followed a war with Perdiccas, on whose murder (B.C. 321) A. became supreme regent. But he died soon after; and though he had a son, Cassander, he left the regency to Polyperchon.—Another A., who has a place in history, was the father of Herod the Great. An Idumean noble, brought up at the court of Alexander Jannæus, he played a prudent part during the conquest of Palestine by Pompey, and was rewarded after the establishment of Roman rule with a variety of honours. Finally, in B.C. 47, A. was made procurator of Judæa by Julius Cæsar, but was poisoned four years later at the instigation of a man whose life he had twice saved.

Antipathy may be defined as the injurious effect, or violent disgust, produced on a person otherwise healthy by an object which does not generally so affect persons of similar organisation. Effects possibly due to a diseased state of the organism must be excluded. The power of habit also must be discounted. Thus Foderé says the fishers of Martigues, who lived on fish, had an A. to meat-broth. This might have been expected: it is often found difficult to resume the eating of pork after discontinuance, but the wholesome variety of modern diet makes this effect rare. Effects sometimes assigned to A. have been traced to actual poisons; as in diseased or putrefied meat, and the cheese and sausage poisons. Again, mental association, especially if operating during childhood, may produce powerful A.; e.g., to the diet used during a painful illness, or to the food which by surfeit caused a violent sickness, the mere sight tending to reproduce the feeling. Pure emotion may produce a real A., as in the physical loathing of a murderer. Certain antipathies, originally common to all men, may be got rid of; e.g., the horror of contact with cold-blooded animals (intensified in some cases by hereditary association of danger); the loathing sickness of the dissecting-room is also removed by practice. Similarly, habit modifies the effect of the narcotic poisons. It is, however, undeniable that pork, shellfish, esculent mushrooms, red fish, and eggs have frequently acted like poisons, causing sickness and fainting. A. belonging to the alimentary canal should, unless frequently repeated, be viewed with suspicion, as the state of the organs is never precisely known. There are antipathies belonging to the special senses: the sight of a toad and the smelling of musk have caused fainting and convulsions. Drawing the finger across the pile of cloth or velvet often has the same effect on the teeth as the noise of scissor-grinding.

Antiphlogistics, a term used in *materia medica* to denote a group of substances which diminish febrile action, and more especially produce a fall of temperature. The normal temperature of the human body is 98.4° F. In fevers, and in surgical affections accompanied by inflammation, there is a rise of temperature—in some cases reaching 106° F.—a sign of grave import,

and always associated with much distress. If such remedies as acetate, sulphate of quinine, spirit of nitric ether, or acetate of ammonia, be frequently given in small doses, the temperature may be lowered, and the skin, instead of being dry and hot, becomes moist and cool. Such remedies, therefore, are largely used in medical practice, although the *rationale* of their action is not understood.

Antiphon, Attic orator, son of Sophilus the Sophist, born at Rhamnus in Attica, B.C. 480. Living when the meretricious fame of Gorgias was at its height, A. resolved to avoid mere tricks of rhetoric, and to produce conviction by solid arguments. He opened a school, in which he laid down sound laws for the regulation of public oratory, and in which Thucydides was a pupil. He did not himself practise oratory, but wrote speeches for others, in which he introduced his own political views, and thus did much for the overthrow of democracy at Athens (B.C. 411), and the introduction of the oligarchy of the Four Hundred. In answer to a charge of treason, for having attempted to negotiate peace with Sparta, he made a splendid but unavailing defence, and was condemned to death, nor were his remains allowed burial in Attic soil. Fifteen of sixty orations composed by him are extant; three written for others, and twelve as specimens for his pupils. The former are clear, true, natural, and vigorously expressed, qualities not found, at least to anything like an equal degree, in the latter. The genuineness of the extant orations is generally admitted.

Antiphony, a method of performing music (chiefly in religious observances) in use among the Hebrews and other Eastern nations, in which two sets of voices sang alternately. It is intimately connected with the parallelisms characteristic of the poetry of the same people. It was adopted by the early Christians; and in this country the traces of it still exist in the 'Deani' and 'Cantoris' sides of the choir in the English Church.

Antipodes (from the Gr. *anti*, against, and *pous, podos*, a foot) is a term applied to the inhabitants of places diametrically opposite, or, generally, to the places themselves. In the 8th c. those who held the existence of such inhabited countries were excommunicated, the doctrine being considered contradictory to the teaching of the Bible. From the definition, it follows that the A. must be on the same great meridional circle, and the one as much S. as the other is N. of the equator. A. Island, to the S.E. of New Zealand, pretty accurately fulfils these relations with respect to London, for which reason it received its name. Various other minor relations also subsist between such places. Thus, the noon of any place must be the midnight of its A.; the summer and autumn of the one corresponds with the winter and spring of the other. Also, the time of day of any place is either twelve hours before or after that of its A., according as you regard the former as W. or E. of the latter.

Antipope, a term applied to a pope not canonically chosen. The first of whom history makes mention is Laurentius, who flourished at the close of the 4th c. The lofty theory of a 'Holy Roman Empire' inspired the successors of Charlemagne with the belief that it was their duty to remove unworthy bishops from the See of St Peter. Thus Otho the Great, Emperor of Germany, in 962 deposed John XII. for licentiousness, and put Leo VIII. in his place. Others, again, interfered for purely political reasons. Thus, in the 11th c., Conrad II. reinstated Benedict IX., who had been expelled by the Romans for his shameless depravity, his substitute, Pope Sylvester III., ruling only three months. Benedict next sold the pontificate to Gregory VI.; but the three popes, all alike unworthy, were deposed by a council held at Sutri, presided over by a German sovereign, and Clement II. was chosen in their stead, 1046. The history of the popedom bristles with similar unseemly scenes. On the death of Honorius III., France, imitating the example of Germany, assisted Innocent II. against the partisans of Anaclet; and even Sicily, ignoring the choice of the emperors, sometimes set up a pope of its own selection. The election of Urban VI., after the death of Gregory XI. in 1378, produced a schism, known in history as 'the great schism of the West,' which lasted fifty years; the French cardinals setting up an A., Clement VII., between whom and Urban VI. the spiritual allegiance of Europe was divided—France, Austria, Spain, Savoy, Genoa, and Scotland siding with the seceders. The last A. was Clement VIII. The dogma of papal infallibility, supposed to

be discredited by these proceedings, is, strictly speaking, not involved by them, because points of doctrine are not at stake; but there can be no doubt that the ambitious intrigues of rival pontiffs have brought the dogma into disrepute.

Antiquaries, Society of. Under this title there are societies in many of the cities of Europe and of America, whose object is to cultivate the study of antiquities, and to preserve the relics of past ages. The earliest S. of A. known to have existed in England was instituted in 1572. It petitioned Elizabeth for a charter of incorporation: the MS. of the petition is in the Cottonian Collection. This society was dissolved by James I. In 1707 another S. of A. was instituted in London. It was reconstructed in 1717. Its minutes begin 1st January 1718. In 1750 it was incorporated by royal charter. It consists of a president, who is *ex officio* a trustee of the British Museum, a council of twenty-one, and several hundred fellows. It has published many valuable works. The S. of A. of Scotland was founded in 1780. Its valuable museum is kept at the expense of government, and now belongs to the nation. See **ARCHÆOLOGY**.

Antique, a term applied to Greek and Roman works of art, to distinguish them from the mediæval and the modern. Greek sculpture passed through several phases, which have their counterparts in the Greek literature and life. The earliest statues are somewhat barbaric, formal, and wanting in flexibility; then follow Titan-like forms, having their analogues in the grand creations of Æschylus; next, like the characters of the Sophoclean drama, come the noblest ideals of humanity, as the sculptures of Phidias and his contemporaries; and then the works of Praxiteles, no longer purely ideal, but, like the characters of Euripides, more in the realm of actual life. With the rise of comedy, everyday forms were introduced. The Roman antiques are not ideal, but real, representing actual life, and thus in keeping with the character of the conquerors and administrators of the world.

Antiquities. See **ARCHÆOLOGY**.

Antirrhinum, a genus of plants belonging to the natural order *Scrophulariaceæ*. See **SNAPDRAGON**.

Antiscorbutics are remedies which act beneficially in the treatment of scurvy, or scorbutus. This disease is believed to be caused by the blood containing an inadequate amount of potash salts, and the virtue of A. is owing to the quantity of potash salts they contain. The chief A. are lemon or lime-juice, oranges, salads, water-cresses, potatoes, greens, onions, radishes, carrots, pickles, common sorrel, dandelion, &c. Acid tartrate of potash, malate or citrate of potash, also belong to the same class. See **SCURVY**.

Antiseptics are employed to prevent or arrest putrefaction. Modern research has shown that all putrefactive changes are caused by the development of minute organisms called *Bacteria*, whose germs have been deposited in the substances liable to putrescence, either from the air or by contact with other substances containing them. In order to prevent putrefaction, it is necessary to destroy these germs, or the mature bacteria, or, if they are not present already, to prevent their coming in contact with the substance to be preserved. Putrefaction may be arrested by simply heating the substances in which it has commenced to the temperature of boiling water, or by cooling them to the freezing-point of the same liquid. Unless, however, the air be excluded after this treatment, or the substances maintained at one or other of the above temperatures, putrefaction will again commence, because new germs will be deposited from the air, and soon develop into bacteria. Meat is preserved by boiling it in tin vessels, and, when all air has been displaced by steam, hermetically sealing them. Fish is often transported packed in ice, and may be preserved for any length of time if maintained at its temperature, and people accidentally buried in glaciers have been found after the lapse of many years exhibiting no sign of decomposition. Heat, cold, and exclusion of air may be called physical A., whereas substances which act as direct poisons on the bacteria may be termed chemical A., and it is in the latter sense that the word antiseptic is usually employed. A quantity of one of these bodies added to any substance liable to putrefaction preserves it, or if putrefaction has already commenced, causes it to be arrested. The more important A. are, spirit of wine more or less diluted, carbolic

acid, solution of corrosive sublimate, white arsenic (arsenious acid), alum, chloride of zinc (Burnett's fluid), permanganate of potash (Condy's fluid), salt brine, saltpetre, and many other metallic salts.

Antispasmodics are medicines which have the property of arresting or of diminishing spasmodic affections of the muscles. The word also includes remedies which allay irritability of mind. Spasm of muscles may occur in hysteria, in painful colic, in whooping-cough, in the breathlessness of asthma, in *angina pectoris*, and in neuralgia. In such cases, spirit of ether, tincture of castor, spirit of chloroform, aromatic spirit of ammonia, oil of peppermint, carbonate of ammonia, asafoetida, tincture or infusion of valerian, bromide of potassium, may allay the severe symptoms. These are the chief A.

Antisthenes, founder of the sect of the Cynics, son of an Athenian, was born in the latter part of the 5th c. B.C., survived the battle of Leuctra (B.C. 371), and died at Athens at the age of seventy. He was a disciple first of Gorgias, and then of Socrates, whose death he witnessed. He taught in the Cynosarges at Athens, whence, probably, the name of his sect, though some affect to derive it from *kunikos*, 'dog-gish,' in allusion either to the snarling ethics, or the filthy habits of his more extravagant followers. He wrote much, chiefly in the form of dialogue. The fragments of his writings that remain were collected by Winckelmann, and published in 1842. His philosophical system, almost purely ethical, represents pleasure as an evil, and pain as a blessing. The highest good, according to A., consists in virtue, which again consists in action. His disciple Diogenes, more famous as a cynic even than A. himself, remained with him till his death.

Antithesis (Gr. *anti*, against; *tithēmi*, to place), a figure of rhetoric which consists in the explicit statement of the contrast implied in the meaning of any term or description. It derives its force from a principle of the human mind—viz., that we are vividly affected only by change of impression, whether as regards knowledge or feeling.

Antitrinitarian, the name given to one who rejects the doctrine of the Trinity for philosophical reasons. If the objection is based on theology, the objector is called a Unitarian.

Antitype (Gr. *anti*, answering to, and *typos*, figure), the correlative of some other type; thus, the paschal lamb is the type or figure of which Christ is the A.

Antium, an ancient city of Latium, 38 miles S.S.E. of Rome, now Porto d'Anzo. It passed into the hands of the Volscians shortly after the expulsion of the kings from Rome, and was a troublesome enemy of Rome till subdued (338 B.C.). The wealthy Romans resorted to A., where they built splendid villas, among the ruins of which were discovered the Apollo Belvedere, and the Borghese or Fighting Gladiator. Caligula and Nero were born here, and there still exist the remains of two moles constructed by Nero, which made A. one of the finest of Italian ports. It was serviceable as late as 537 A.D.

Antlia (Lat. *antlia*, a pump), the name applied to the elongated tube or proboscis forming a chief organ in the mouth of Lepidopterous insects (butterflies and moths), and by means of which they suck up the flower-juices on which they subsist. This organ is formed by the modification of the *maxilla* or lesser pair of jaws, seen in typical form in the biting or masticatory mouths of other insects.

Ant-Lion, the name given to the young or larval stage of a Neuropterous insect (*Myrmaleo formicarium*) which in its perfect stage somewhat resembles the dragon-flies, belonging to the same order of the insect class. It inhabits S. Europe chiefly. The larval form is about half an inch in length, possesses six legs, and powerful mandibles or jaws. It excavates a pit in the sand, in which it lies in wait for unwary insects which may tumble into the trap; and it is said to assist their capture by throwing up jets of sand at such as appear in danger of escaping, and thus jerks them backwards into its trap. It sucks the juices of the prey, and then throws out the bodies from its lair. The pit is often of considerable size, averaging 25 or 30 inches in diameter, and from 15 to 20 in depth.

Antommar'chi, Francesco, a celebrated physician, born in Corsica towards the end of the 18th c. He was a professor

of anatomy at the University of Florence, but is chiefly known as the friend and attendant of Napoleon during the exile in St Helena. As a token of attachment, the emperor bequeathed a legacy of 100,000 francs to his faithful countryman, who in 1823 published *Les Derniers Moments de Napoléon* (new ed. 1852), an unpretentious work full of natural pathos. Some considerable time after his return to Paris he produced a cast of Napoleon's head, professing to have taken it after the death of the emperor. Public opinion seems, however, to have thrown considerable doubt on the genuineness of the work. At last, worried by the bitter attacks of the press, A. emigrated to America, and died at San Antonio, Cuba, 3d April 1838. He published a continuation of a large work on anatomy by his old master, Mascagni of Florence (Pisa, 1823-26).

Antonelli, Giacomo, Cardinal, and secretary to Pope Pius IX., was born, 2d April 1806, at Sonnino, on the Neapolitan frontier. The son of a herdsman, though of an ancient family, he was educated at the Grand Seminary of Rome, where he attracted the attention of the late Gregory XVI., who named him *prelato*, and raised him to several distinguished offices. In 1846 he was made Cardinal-Deacon of St Agatha alla Suburra, and gradually acquired an influence over Pius IX. almost amounting to domination. A. was a member of the committee which gave to Italy the liberal constitution of 1848, the chief articles of which were soon after violated. In September 1850 he was made Secretary of State, and later President of the Council of Ministers, Prefect of the Sacred Apostolic Palaces, &c. Virtually Papal Prime Minister, he conducted diplomatic intercourse, and controlled all transactions of an official nature. At various times the Church benefited by his energy, decision, and shrewdness. During the agitation following on the Œcumenical Council of 1870 he came prominently forward in defence of papal interests. A. died November 6, 1876.

Antonelli (of Messina), a celebrated painter, born in Sicily early in the 15th c. He introduced into Italy the art of oil-painting, which he had been taught by Johann van Eyck of Flanders. The probable date of his death is 1493. Several of his pictures are in the collections of London, Berlin, Vienna, and Palermo.

Antoninus, Itinerary of. See *ITINERARY*.

Antoninus, Marcus Aurelius, 'the philosopher,' son of Annus Verus and Domitia Calvilla, born at Rome, April 20, 121 A.D., was, after his father's death, adopted by his grandfather. In 138 both A. and Lucius C. Commodus were adopted by Antoninus Pius, and Faustina, daughter of Pius, was chosen as the wife of A., though seven years elapsed before the marriage took place. In 140, A. was appointed consul; and on the death of Pius in 161, he succeeded to the throne, voluntarily sharing the government with Lucius, at the same time betrothing to him his daughter Lucilla. A long-threatened war with Parthia breaking out in the year of their accession, the command of the Roman forces was intrusted to Lucius, who, however, proceeded no further than Antioch, where he gave himself up to drunkenness and the most degrading pleasures. Avidius Cassius, intrusted with the command, forced the Parthians to sue for peace, and Lucius returning to Rome in 166, was honoured with an undeserved triumph. A formidable confederacy of the northern tribes now menaced Italy, while the general gloom was deepened by famine and pestilence within Rome itself. Both emperors set out to the war, after rites of unusual solemnity, and a profusion of expiatory sacrifices. In 168 the barbarians were forced to sue for peace, and in 169 Lucius died, when the sole command of the war, which was now renewed, devolved on A. Though embarrassed by difficulties, he prosecuted the war with such vigour that he nearly exterminated the Marcomanni. His victory over the Quadi in 174 was accompanied by circumstances believed to be supernatural, and which gave origin to eager discussions among Christian historians upon the miracle of the Thundering Legion. Dio Cassius states that the cloudless sky suddenly darkening, much rain fell, of which the Romans, dying of thirst in the summer heat, were availing themselves, when they were suddenly attacked by the barbarians. Their position was critical, but they were rescued from it by the descent on their assailants of a fierce storm of fire and hail. That some singular circumstance intervened is attested not only

by the ancient historians, but by the sculptures of the Antonine column, and by an extant letter of Aurelius himself. The latest attempt to vindicate the miraculous character of the incident is that by Mr Newman in his essay prefixed to part of Fleury's *Ecclesiastical History* (Oxf. 1842). While the northern tribes, as a consequence of this overthrow, hastened to submit, or solicit protection, a new danger threatened from the East, the result of the intrigues of Faustina. A false report of the death of A. induced Cassius, the hero of the Parthian campaign, with whom Faustina was in treasonable communication, to rebel and seize Asia Minor. A. was preparing to set out for the East when he heard of the assassination of Cassius. In an address to his soldiers he lamented that he had no longer an opportunity of pardoning the traitor; and when the bloody head of Cassius was brought to him, he shrunk from it with horror, and refused to see the murderers. His first act on arriving in the East was to burn the papers of Cassius unread, that he might calm the fears of those nobles who were implicated in the rebellion. His wife Faustina, who had accompanied him, died at a village in the defiles of Mount Taurus, and A., though conscious of her profligacy and treason, with inexplicable weakness was prodigal of honours to her memory. Returning to Italy by way of Athens, he celebrated his triumph, December 23, 176. Fresh outbreaks on the Danube called him once more to Germany, where success again attended his arms. But his constitution was shattered by incessant toil and anxiety, and he died, March 17, 180, either at Vindobona (Vienna) or at Sirmium.

At the early age of twelve, A. was an avowed Stoic. His instructors in the doctrines of the Porch were Diognotus, Apollonius, and Junius Rusticus. That a nature so gentle should have been drawn to a philosophy so austere is to be explained by the practical character of stoicism, and its uncompromising antagonism to sensual indulgence, then the canker-worm of the Roman empire. But his studies were not confined to philosophy: he was learned in morals and jurisprudence, in metaphysics and mathematics, in music, poetry, and the fine arts. A nobler life can hardly be found in the records of humanity. It was believed that he had been sent by the gods to bless mankind, and that his death, which was accepted as a public calamity, was only a return to the heaven whence he had come. His persecution of Christianity, than which no historical fact is more clearly established, is not only not inconsistent with the inherent nobility and purity of his character, but was a natural outcome of it. The sincerity of his own belief made him intolerant of a system which gave no quarter to the old faith, and which from ignorance he believed to be not only a foul superstition, but whose followers he probably imagined to form a dangerous political association. The only work of A. that has come down to us is a commonplace-book or diary in Greek usually called the *Meditations*, of which the *editio princeps* appeared in 1558. The latest recension is that of Komes (Paris, 1816). Numerous translations exist in most European languages. There is even one into Persian by Hammer (Vien. 1831).

Antoninus, Wall of (*Antonini Vallum*), a military defence constructed by Lollius Urbicus, imperial legate in Britain in the reign of Antoninus Pius, to protect the southern districts from the fierce inroads of the Caledonians. It was executed about the year 140 A.D., extended from Carriden or Kinniel on the Forth, to Old Kirkpatrick or Dunglass Castle on the Clyde, a distance of 27 miles, and consisted of a ditch 20 feet deep and 40 wide, facing the N., with a mound or rampart on the S. side, and behind that again a military road. Forts, with watch-towers between, were erected at intervals along the line. Portions of the Roman structure, which at a later period was popularly known as Graham's Dike, are still traceable.

Antoninus Pius, Titus Aurelius Fulvius, a Roman emperor, born A.D. 86, of a family from Transalpine Gaul. He was appointed consul in 120, was adopted by Hadrian in 138, and the same year ascended the throne. The twenty-two years of his reign, otherwise nearly a historic blank, constituted a continuous period of tranquil prosperity. Internal tumult and foreign aggression were promptly crushed, but there was no war of conquest. An insurrection in the N. of Britain was repressed, and a wall—the Wall of Antonine—built between the Forth and the Clyde, as a defence against the inroads of the Caledonians. A. was a patron of literature, a wise lawgiver, and a thoughtful sanitary reformer. The title *Pius* was bestowed

on him probably for his vindication of the memory of Hadrian against a resolution of the senate. He died 7th March 161.

Ant'nius, Marcus, the triumvir, better known to English readers as **Mark Antony**, was born 83 B.C., of an old patrician family, and related by his mother to Julius Caesar. After a dissolute youth, he fled from his creditors to Greece, B.C. 58, and thence to Syria, where he commanded the cavalry under the Proconsul A. Gabinus. After serving with Caesar in Gaul, he repaired to Rome (B.C. 50) in the interest of the latter, and was chosen a tribune of the people. When the war broke out between Caesar and Pompey, A. commanded Caesar's left wing at Pharsalia, and during the latter's absence in Africa, was intrusted with the government of Italy, when he made himself notorious by his debaucheries. In 44 B.C. he was chosen consul; and when Caesar was assassinated, A. excited such a storm of popular indignation against the conspirators, that they were forced to escape from Rome. After a quarrel with Octavianus, he repaired to a consultation with him and Lepidus, at which the three (hence the name 'triumvirs,' strictly *Triumviri Reipublica Constituenda*) agreed to share the empire between themselves, as a first step to which they put to death all whose power and patriotism were dangerous to their pretensions, and among them the orator Cicero. After a campaign in Macedonia in conjunction with Octavianus, in which they defeated the forces of Brutus and Cassius, A. repaired to Asia to settle his dispute with Cleopatra, by whose beauty he was at once captivated, and he gave himself up to a life of luxurious idleness. A second division of the empire was arranged at Brundisium, the East falling to A., who married Octavia, sister of Octavianus; but he soon after resumed his voluptuous courses with Cleopatra, which roused the ire of the Romans, and widened the breach between him and his brother-in-law. Octavianus declared war against Cleopatra, whose forces, with those of A., were totally defeated at Actium (q. v.), 31 B.C. The infatuation of A. brought him once more to Egypt, where he renewed his career of debauchery; but his pleasures were interrupted by the arrival of Octavianus at Alexandria. Bestirring himself, he gained a trifling advantage in a charge with his cavalry; but his star had paled before that of his rival, and hope abandoned him. A false report had reached him as to the death of Cleopatra, when, falling on his sword, he died, 30 B.C., at the age of fifty-three.

Ant'nius, or Ant'ony of Padua, or of **Portugal, St.**, was born at Lisbon, August 15, 1195; studied at Coimbra, and entered the order of St Francis, who was still living. Possessed by a desire for martyrdom, he embarked for Africa, but contrary winds drove him on the coast of Italy, where he gave himself up to theology and preaching at Montpellier, Toulouse, and Padua, where he died 13th June 1231, and where a church bearing his name contains his monument. His sermons (*Sermones Dominicales, Adventus, Quadragesimales*, &c.) are written in the style of his age, when it was customary to sacrifice the literal sense of Scripture to mystical subtleties. The most complete edition is that by Azzoguidi (Bologna, 1757).

Anton', Ul'ric. See ANNA CARLOVNA.

Ant'ony, St., sometimes called **The Great**, and sometimes **Antony of Thebes**, born about 251 A.D., at Koma, in Upper Egypt, was the father of monachism. His parents gave him a very religious, but not a very intellectual, education. All through life he could speak only the Coptic language, and was ignorant of all the literature and philosophy of Greece. About the age of twenty, in obedience to what he believed to be a divine injunction, he sold his possessions, the price of which he gave to the poor, and retired to the wilderness to lead an ascetic life. Not satisfied with even this severe discipline, at the age of thirty-five he separated himself further from the haunts of men, and passed twenty years in the most profound seclusion in an ancient ruin. In 305 he founded the monastery of Faioum, near Memphis, in answer to the prayers of a multitude of anchorites who wished to live under his guidance, but visited Alexandria in 311, during the persecution of the Christians under Maximian, hoping for martyrdom, but in vain. He now sought a deeper solitude near the Red Sea, but having been discovered by his disciples, he returned with them. Again leaving them, he sought the valley of the Nile, but in 335 repaired to Alexandria during the Arian controversy. Feeling the approach of death, he returned to the wilderness, and there died, 356 A.D.,

at the age of 105. Of all the saints in the Romish Calendar, A. is the most popular. His festival is on 17th January. See the *Acta Sanctorum* of the Bollandists, and the *Life of St A.* by Athanasius, translated into Latin by Evagrius.

Antraignes', Emmanuel-Louis-Henri de Launay, Comte d', a talented but unscrupulous statesman, born about 1755, at Ville-Neuve-de-Berg, Vivarais, in the French department of Ardèche. The Abbé Maury was his teacher, and his first literary essay (1788) contained a bold attack on the prevailing governments of Europe, and helped to hasten the French Revolution. When elected deputy for his native town, 1789, he suddenly became a strong Conservative, opposed the union of the three estates, and upheld the royal veto as essential to right government. He quitted France, 1790, and was engaged in diplomacy for several years at Vienna, St Petersburg, and Dresden. While in Russia, he joined the Greek Church, and was a pensioner of the Czar. Many letters and pamphlets were thrown off meanwhile on current subjects, most of which show him as a Bourbon partisan. On the 22d July 1812, A. and his wife were murdered, near London, by an Italian servant named Lorenzo, who had revealed his correspondence to the agents of the French emperor in London, and who dreaded the discovery of his perfidy. A.'s pamphlets are numerous, and were once interesting.

An'trim, a county in the N.E. of Ireland, bounded on the N. and E. by the sea, on the W. by the county of Londonderry and Lough Neagh, and on the S. by the county of Down. Area, 1164 sq. miles. The E. coast is hilly, with ranges stretching into the interior, which slopes towards the S.W. The surface is chiefly composed of basaltic trap, the basalt sometimes assuming strange and picturesque forms, as in the case of the well-known Giant's Causeway on the N. coast. Rathlin or Rachra Island (where Bruce lay hid one winter) and the Skerries ('rocks') lie off the same coast. The principal rivers are the Bann, the Lagan, Bush, and Main. Peat-bogs are large and numerous. Coal, salt, and iron are found. Oats are the chief crop: 66,254,851 acres under crop in 1872, 86,322 were under oats. There are manufactures of linen, cotton, woollen goods, &c., and considerable fisheries are carried on. The chief town: see A., Belfast, Carrickfergus, and Lisburn. A. returns six members to Parliament—two for the county, and four for boroughs. The population in 1871 was 404,015, more than half of whom were Presbyterians, the descendants of Scotch and English colonists.

An'trum, a term used in anatomy to denote a space or cavity. The most important is the A. of Highmore in the superior maxillary bone, which communicates with the nose. This space is sometimes the seat of an abscess or of a tumour.

Ant'-Thrushes, or **Ant'-Oatchers**, a group of Insectorial or Perching birds, included in the Deutrostral section of the order, and forming the types of a sub-family (*Formicariinae*), which in turn is included in the *Turdida* or Thrush family. The bill is strong, somewhat straight, but generally hooked at the tip. The tarsi are long, and covered with large scales. The wings are short, and the flight is in consequence of limited nature. The genus *Pitta*, the members of which are found in S.E. Asia and the E. Archipelago, represent these forms—*P. Bengulensis* and *P. Nepalensis* being familiar forms. *Brachypteryx* is another genus of these birds, *B. montana* being found in Java. The S. American species are also numerous, the *Erallaria rex* being the best known of these forms.

Ant'werp (Fr. *Anvers*), the chief commercial city in Belgium, capital of a province of the same name, is situated on the river Scheldt. It is also the Belgian military headquarters, and one of the most strongly fortified towns of Europe, being defended by a recently-built wall, a new and an old citadel, numerous ditches, and a line of detached forts. There is an intricate system of basins, docks, wharfs, and quays; but the harbour, though capable of accommodating some 4000 vessels, is deficient in size, and much of the trade has of late years been transferred to other ports. In 1873 the remarkably small number of only thirty-three vessels belonged to A. For some time (1875) a scheme has been on foot to establish a new commercial town on the left bank of the Scheldt, where unlimited additions might be made to the harbour, and to connect it with A. by a bridge.

The principal building in A. is the Cathedral, erected in the 14th c., a splendid Gothic structure, with a tower 380 feet high, and containing several of Rubens' finest pictures. There are also a Museum, an Academy of Sciences, an Academy of Painting and Sculpture, a Naval Arsenal, Zoological Gardens, a Medical School, and the oldest Exchange in Europe. The chief exports are woollen yarn, flax, sugar, paper, hides, and petroleum. Imports—cotton, silk, oil, and iron. There are important manufactures of thread, silk, sugar, tobacco, and printer's ink; besides which there is extensive shipbuilding. Pop. (1870) 126,663, mostly Flemish. A. is mentioned as early as the 8th c.; flourished during the middle ages; but attained its greatest prosperity in the 16th c., when it had more than 200,000 inhabitants. The rise of the Dutch Republic and the enterprise of the Amsterdamers subsequently deprived it of its superiority. It has sustained numerous sieges, the last in 1832, when France and England forced Holland to surrender it to Belgium.

Anu'bis, an Egyptian deity, the sixth of the twelve deities who formed the second order, and whose duties lay among the elements of nature, was the son of Osiris and Nephthys, a sister of Isis, and was styled by the Greeks Hermanubus. He appears on monuments with the head of a jackal or dog, and long, pointed ears. Like Hermes, he was the 'shade-conductor,' and in Hades assisted Horus to weigh judiciously the lives of the departed. The Romans invested A. with the insignia of Hermes, in addition to his own. The proper sacrifice to A. was a white-and-yellow cock.

Anupshuhur', a town in the division of Meerut, N.W. Provinces, India, on the Ganges, 73 miles E. of Delhi. It is built chiefly of mud and coarse bricks, but has an increasing trade in cotton, cocoa-nuts, pulse, tobacco, and saltpetre. Pop. (1871) 10,644.

Anus, or **Vent**, the terminal orifice of the alimentary canal of animal forms, in which the intestine opens. Occasionally, as in some of the Brachiopodous mollusca, a perfect digestive system may exist without any anal opening being discernible, the intestine ending cæcally, or like a pocket. In the *Tunicata* or Sea-Squirts (q. v.), the intestine ends in a special sac or *atrium*. In birds, reptiles, and amphibia, in some fishes, and in certain lower mammals, the intestine terminates in a chamber or *cloaca*, common to the efferent ducts of the urinary, generative, and digestive systems. The anal opening is that by which the effete or excrementitious products of digestion are expelled from the body. In higher forms it is provided with special (*sphincter*) muscles for its closure, and is also in many forms provided with glandular appendages. See ANAL GLANDS.

Anus, Diseases of. The A. is the lower termination of the alimentary canal. It is a dilatible opening, lined internally by mucous membrane, and externally by the skin. The skin, which is thrown into folds during the closure of the orifice, is covered by sensitive papillæ, and contains small sebaceous or oily glands. The diseases to which it is liable are numerous. They are as follows:—

1. **Ulcer and fissure of the A.** These are both distressing affections, giving rise to great pain during defæcation. The treatment is the application of nitrate of silver to the fissure, and the use of a suppository containing morphia or belladonna. In severe cases it becomes necessary to cut the affected mucous membrane, and part of the fibres of the sphincter muscle, so as to set the part at rest.

2. **Spasmodic contraction of the sphincter ani**, often associated with fissure or ulcer of the A. Local sedatives are required.

3. **Abscess in the neighbourhood of the A.** is frequent. It is important to prevent the pus burrowing into the bowel, and therefore the practice is to open freely from the surface at an early stage.

4. **Fistula in ano.** When an abscess forms by the side of the A., it occasionally discharges its contents into the bowel, contracts, and leaves a sinus, which is termed a *fistula in ano*. There are usually two openings into the fistula, one by the side of the A., and the other opening into the gut. The treatment consists in laying the fistula open by cutting from it into the bowel. The wound is then healed by granulations from the bottom, and the fistula is thus got rid of.

5. **Hæmorrhoids, or Piles.** These are small swellings of the

blood-vessels of the A. and lower part of the rectum, which may or may not give rise to bleeding when the bowels are moved. They are of two kinds, internal, or within the A., and external, or round the orifice. The former always bleed, the latter frequently do so. A sedentary life, intemperance in food and drink, the habitual use of drastic purgatives, hard exercise on horseback, and the existence of other diseases in the pelvis, are the chief predisposing and exciting causes of the disease. In addition to the constant irritation caused by their presence, the system soon suffers from the repeated bleedings, and the individual becomes anæmic. The treatment is constitutional and local: *constitutional*—a mild, nutritious diet, the use of purgatives, such as electuary of senna, castor oil, or sulphur, twice or thrice a week, so as gently to open the bowels, and general tonic treatment: *local*—sponging with cold water night and morning, the use of an astringent injection (ten drops of tincture of the perchloride of iron to an ounce of water), or the use of an astringent ointment, such as compound ointment of galls. These measures are merely palliative. To effect a cure, surgical interference is required. This consists essentially in applying a ligature round the hæmorrhoid, and then cutting it off. Sometimes, for external piles, the application of a ligature is not necessary.

6. **Prolapsus ani** is a protrusion of the mucous membrane through the anal orifice. It frequently occurs in feeble children. The palliative treatment is to return the bowel as gently as possible, and afterwards to retain it in its place by wearing a belt with a pad and elastic support. Sometimes, though rarely, a surgical operation is necessary.

An'ville, Jean Baptiste Bourguignon d', perhaps the greatest of French geographers, was born at Paris in 1697. He was particularly versed in ancient and classical geography, and he devoted his whole life to this his favourite science. His first production was a map of ancient Greece, published when he was only fifteen. His map of Italy, for which he was especially famed, was published in 1743. Altogether, he published 104 maps on ancient, and 106 on modern, geography. A. died in 1782. His valuable collection was bought by Louis XVI. for the Royal Library in 1779. But his geographical treatises are no less admirable for their time, full of erudition, and of curious, exact, and searching criticism. The works of A., announced by M. de Maune in 1806, were to be in 6 vols., with maps drawn up from the designs of A. himself; but the death of M. de Maune in 1832 arrested the publication at the second volume.

Anwa'ri, a celebrated Persian poet of the 12th c., born in the province of Khorassan, and educated at the Mansur College at Tus. The story of his sudden rise to fame is highly romantic. A grand procession of the Seljukide sultan, Sanjar, at Tus, so dazzled the young poet that he passed the night in writing a poem descriptive of the pageant. Next morning the poem was presented to the sultan, who was so pleased with the production that he placed its author among his courtiers. A. had now ample time to cultivate his art, and he wrote many beautiful love-songs (*ghazels*), and several striking but lavishly ornate panegyrics, besides elegies and satires or *kasidas*. He also addicted himself to the study of astrology. He died at Balkh in 1200 or 1201, whither he had been forced to withdraw owing to the failure of one of his astrological predictions.

Aonlaganj', a town in the British district of Bareilly, N.W. Provinces, India, 150 miles W. of Delhi. It has a large bazaar and an increasing trade. Pop. (1871) 9947.

A'orist (or Gr. indefinite), a tense of the Greek verb which expresses an action undefined as to time. The use of this tense gives great animation to narrative.

Aorta, the chief or main artery originating from the left ventricle of the heart in mammals and birds, and which, through its branches, distributes the pure or arterial blood throughout the body. In man, the A. arises from the upper and back part of the left ventricle. It then ascends forwards to the right, and then curves backwards to the left, thus forming an arch known as the *arch of the A.* It turns over the left *bronchus* (or left main division of the windpipe), and passes in an oblique manner from the breast-bone towards the spine. It then descends vertically in front of the spine on the left side, and at the level of the fourth lumbar vertebra divides into the two common *iliac arteries*, which, together with their branches, supply the lower parts of the

body with blood. In birds the A. turns over the right instead of over the left bronchus, as in man. The arch of the A. gives off the left common carotid artery, the left subclavian artery, the innominate artery (which shortly divides into the right subclavian and right common carotid arteries), and the two coronary arteries which supply the heart itself with blood. The entrance to the A. is guarded by three membranous flaps or valves, preventing regurgitation of the blood into the left ventricle, and termed the *semilunar valves of the A.* In the fœtus before birth, the pulmonary artery and A. communicate by means of the *ductus arteriosus*; this communication becoming obliterated soon after birth. The A. in the chest gives off the *bronchial arteries* supplying the lungs; the *oesophageal arteries* supplying the gullet, and the *intercostals* distributed to the walls of the chest. The abdominal A. gives off the two *phrenic arteries*, or those of the *diaphragm* or 'midriff'; the *celiac axis* supplying the spleen, liver, and stomach; the *superior mesenteric* and *inferior mesenteric arteries* for the intestines; the *renals* and *supra renals* for the kidneys; the *spermatic* for the reproductive and urinary organs; and the *lumbar arteries* for the walls of the abdomen in the region of the loins. The *caudal artery* is a small branch which is abortive in man, but is continued into the tail, in the lower animals.

Aosta (corruption of Augusta), the chief town of a district of the same name in the province of Turin, N. Italy, situated on the left bank of the Dora-baltea, near the base of Mount St Bernard. It is neat and well built, and possesses a handsome town-hall and a fine cathedral. A. was the ancient capital of the Salassi, a brave mountain race, who fiercely opposed Appius Claudius (143 B.C.) when entering Gaul. The Romans under Augustus rebuilt the town, naming it Augusta Prætoria, and it still abounds with many splendid architectural remains. A. is the birthplace of Anselm, Archbishop of Canterbury; and St Bernard de Menthon, founder of the well-known hospice that bears his name, was for some time archdeacon here. It has considerable trade in leather, cheese, and wine; and in the vicinity are the extensive mines and noted baths of St Didier. Pop. (1870) 5958.

Aoudad Sheep (*Ammotragus tragelaphus*), a species of sheep, occupying an intermediate position between sheep and goats, found in the mountainous parts of N. Africa, from Barbary to Abyssinia. It does not possess the lachrymal sinuses of the sheep, but like the latter forms, it is provided with a gland placed between the hoofs. The body-colour is reddish-brown, and the front of the body is covered with a quantity of thick hair, which gives to the fore parts a singular and massive appearance. It exists in small herds, and is of fierce disposition. The horns are of large size, and curved outwardly.

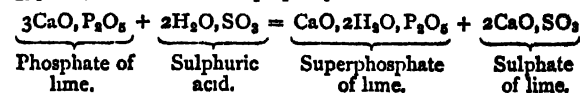
Apafi, Michael I., Prince of Transylvania, was born in 1632, of noble family. He fought with Prince George II. against the Poles in 1656, but was captured by the Tatars under Mohammed Girai. Shortly after his release he was created Prince of Transylvania (1661) by the influence of Ali Pasha, the Turkish generalissimo under Sultan Mahmoud IV. Supported by the Ottoman power, A. enjoyed a tranquil reign, and acquired fresh possessions. He threw off his allegiance to the Porte after its defeat at the siege of Vienna (1683), and was taken under imperial protection. Grief at the death of his wife, Anna Bornemitz (1688), is said to have brought on sufferings from which he died in 1690, just as the Turks were on the point of entering Transylvania to punish him for his perfidy. His son, Michael II., at once ascended the throne. The Turkish forces were for a time successful, but all the places taken were finally regained by the help of the imperial troops. The young prince of Transylvania, discouraged, probably, by his short and stormy reign, was induced to part with his dominions to Austria for a pension of 12,000 or 15,000 florins. He died childless at Vienna, February 1, 1713.

Ap'nage. This word occurs occasionally in Scotch law-books, as signifying the assignment of crown lands and feudal rights to princes of the royal family. It has probably been borrowed from the French law, in which it is a technical term.

Ap'athin, a town in the province of Bacs-Bodrog, Hungary, south of the E. bank of the Danube, 15 miles S.W. of Zombor, and

130 S. of Pesth. It has some trade in hemp, silk, wood, and madder, and much silk is produced in the neighbourhood. Pop. (1869) 9053, mostly German.

Ap'atite is the name of a mineral containing phosphate of lime, $\text{Ca}_3\text{P}_2\text{O}_8$ or $3\text{CaO}, \text{P}_2\text{O}_5$, together with chloride and fluoride of calcium. It is found in Great Britain, in the tin veins of St Michael's Mount, Cornwall, and in Devonshire; also in France, Germany, Norway, and America, and in large quantities in Spain. It is principally employed in the manufacture of superphosphate of lime, $\text{CaO}, 2\text{H}_2\text{O}, \text{P}_2\text{O}_5$, now used in large quantities as an artificial manure. For this purpose A. is ground to powder and treated with sulphuric acid. This acid precipitates two-thirds of the lime present as phosphate, in the form of sulphate of lime (gypsum), whilst soluble superphosphate remains.



Ape, the name applied to the higher *Quadrumanæ* or monkeys, which are included in the sections *Cynocephali* (baboons and mandrills) and *Anthropomorphi* (gorillas, chimpanzees, gibbons, and orangs). The tail in these forms is rudimentary or wanting. See MONKEYS, QUADRUMANA, &c.



Mandrill Baboon.

Ap'eldoorn, a small village, centre of a manufacturing district in the province of Gelderland, Netherlands, 17 miles N. of Arnhem, and connected by means of a canal with a branch of the Yssel. The district has forty-two paper-factories, several copper-foundries, and many corn-mills, and carries on, besides, an active transit trade. Near A. is the *Loe*, a royal hunting lodge. Pop. of the commune (1870), 12,661; but of the village itself, only 1853.

A'p'elles, the most famous painter of antiquity, flourished between 352 and 308 B.C. His father's name was Pythias, and though accounts vary as to his birthplace, the best accredited is that which makes him a native of Colophon, in Asia Minor. He studied first at Ephesus, then at Amphipolis, and last at Sicyon, becoming thus acquainted with the excellences of the different schools. A. was the close friend of Alexander the Great, having lived for some time at the court of his father Philip. He thereafter visited Rhodes, Cos, Alexandria, and Ephesus. His *Venus Anadyomene* was the pride of ancient art. It represented the goddess rising from the sea, the drops falling round her like a transparent silver veil. Though he surpassed all his contemporaries in *grace*, he did not hesitate to attempt the heroic, and his representation of Alexander wielding the thunderbolt greatly pleased Alexander himself. A. was an indefatigable student of his art; hence the origin of the famous proverb, *Nulla dies sine linea* ('No day without its line'). He was just to the merits of his contemporaries, and freely acknowledged the departments in which they excelled himself. He was amenable to criticism, and altered a shoe at the suggestion of a cobbler; but when the same critic ascended to the leg, A. told him to stick to his last; hence the proverb, *Ne sutor supra crepidam*. In honour of this exquisite genius, the art of painting was called *Ars Apellæa*.

Ap'ennines (Lat. *Mons Apenninus* or *Apeninus*, probably connected with the Cymric Celtic *Pen*, a 'head' or 'hill'; comp. *Pen-nine* Range, *Pin-dus*, *Pen-nigant*, &c. The Gaelic Celtic is *Ben*, as *Ben Lomond*, *Ben Ledi*, &c.), a range of mountains stretching the entire length of Italy, between 37° and 44° 33' N. lat., and 7° 40' and 18° 20' E. long. It is a branch of the great Alpine system, with which it is connected at the Col de Tenda, in the province of Coni. Under the name of the Ligurian A. it partly encircles the Gulf of Genoa; it then continues E. beyond Florence, forming the watershed between the latter and the valley of the Po; thence, taking a southerly direction, it becomes the watershed of the peninsula, and terminates in the island of Sicily. The chain is divided by modern

geographers into (1) *North A.*, from the Maritime Alps at the Col de Tenda to the Pass of Borgo San Sepolcro, near the border of Tuscany; (2) *Central A.*, from Arezzo to the river Pescara; (3) *South A.*, from the valley of the Pescara to Cape Spartivento; and (4) *Insular A.*, or Sicilian range. Towards the Adriatic coast the A. are precipitous, but on the W. side they slope gradually, reaching the rich Italian plains through a series of lower ranges known generally as the *Sub-Apennines*. In N. Italy the Ligurian A. are so close upon the Gulf of Genoa that they only send a few streams down to the coast; but on the N. side rise many large rivers which contribute to the Po, after flowing through the plains of Piedmont and Emilia. The main chain of the A. forms to the W. the basins of the Arno, Tiber, Garigliano, and Volturno; while on the E. side numerous mountain torrents rush down the steep ravines which open out on the Adriatic, but there are no basins of any breadth till we reach the province of Apulia. The average height of the entire A. is about 4000 feet; but in the highlands of Abruzzo it reaches 7000 feet, while in the N. it sinks to 3500. The Gran Sasso d'Italia ('Grand Rock of Italy'), in the province of Teramo, is the highest peak in the whole range, rising to a height of about 10,000 feet. Two of the great European volcanoes, Vesuvius and Etna (q. v.), belong to the chain, which, for the most part, is continuous; but which in the S. is crossed by many rugged gorges and fertile valleys. The geological formation varies greatly. While the Secondary Limestones of the Jura occur most frequently, there are the Tertiary beds of the Sub-A., transition clay-slate in abundance, and the recent lavas and scorise of Vesuvius and Etna. The Roman and Neapolitan A. are universally celebrated for their extensive quarries of the finest marble. None of the heights rise to the level of the snow-line, but the lofty peaks of the Abruzzi and Lunigiana are covered with snow from October till May. In general the entire range presents a naked, dreary appearance, in great part due to the comparative scarcity of water; but at the Riviera of Genoa, the Gulf of Naples, and wherever water is plentiful, the lower slopes of the mountains are clad in almost tropical vegetation. Chestnuts, oaks, and corn-fields are often found at an elevation of 300 feet, while in the valleys beneath flourish myrtles, oranges, Indian figs, and gigantic agaves.

Apenra'de, the capital of a district of the same name in the Prussian province of Slesvig-Holstein, lies in an inlet of the Little Belt. It has a good harbour, considerable shipping, and extensive fisheries. The Wends destroyed A. in 1148, and it suffered severely in 1848 on the insurrection of the duchies. There are beautiful environs, and near A. stands the ancient castle of Brundlund, built (1411), on the site of a still more ancient structure, by Queen Margaret of Denmark. Pop. (1871) 5932.

Apet'alous, a term applied to flowers in which the petals or corolla are absent, and also extended to flowers having neither calyx nor corolla, although Achlamydeous (lit. 'coverless') is the proper term to apply in the latter case.

Aphanip'tera, an order of Holometabolic ('complete metamorphosis') insects, in which the wings are of rudimentary nature, and exist in the form of scales or plates on the hinder thoracic segments. The mouth is suctorial in its nature. To this group the fleas (*Pulicidae*) belong, and of this family the common flea (*Pulex irritans*) is a familiar species. The Chigoe (q. v.) (*Pulex penetrans*) of S. America and the W. Indian Islands burrows beneath the skin of the feet, and causes troublesome and painful sores. These insects live parasitically upon various animals.

Apha'sia is loss of speech dependent on disease of the brain. It is not simply loss of voice, which may be caused by disease of the larynx; nor loss of the power of articulation, which may be the result of disease of the mouth or lips; but it is loss of the power of expressing ideas by means of words. A. is sometimes transitory, but in many instances of brain disease it becomes permanent. It may be complete or partial; that is, there is an entire loss of words as connected with ideas, or only the loss of a few. Frequently A. is associated with hemiplegia, that is, paralysis of one side of the body. *Post-mortem* examination has shown that in the great majority of cases of A. morbid changes are found in the third left frontal convolution of the brain. Dr Bastian, of University College, London, has grouped all cases of

A. into three classes, as follows: (1.) Those who can *think*, but cannot *speak or write*; that is to say, the power of co-ordinating the idea with the muscular actions necessary for speaking or writing is abolished—*A. proper*. This is the most common class. (2.) Those who can *think and write*, but cannot *speak*—*Aphemia*. In these cases the mind is unaffected, and there is usually no paralysis. (3.) Those who can *think and speak*, but cannot *write*—*Agraphia*. Such a person, when asked to write a sentence, scrawls an unmeaning mass of letters, while he may be quite conscious of the defect. Such cases confuse the names of common objects, calling a spoon a fork, and so on. A. is a symptom of cerebral disorder, and probably no treatment is likely to be beneficial. See INSANITY.

Aphelion (Gr. *apo*, from; *helios*, the sun) is the most distant point of a planet's or comet's orbit from the sun; the nearest point being called the perihelion. Formerly the Anomaly (q. v.) was measured from the A.; but since the knowledge of comets has been so greatly extended, and as their aphelia are quite out of sight, the anomaly is now taken from the perihelion.

Aphis, the scientific name of the plant-lice belonging to the Hemipterus order of insects, and included in the section *Homoptera* of that order. They are small insects, both sexes being ordinarily wingless, or occasionally provided with four membranous wings. The beak or rostrum springs from the under part of the head or breast. The tarsi consist of two joints, and are provided with two claws. The body is pear-shaped, and at its hinder portion possesses a glandular structure, which secretes a sweet juice of which ants are extremely fond. See ANT. The aphides live upon plants, congregating in immense numbers, and sucking the plant-juices, thus frequently causing a blight, and the death of the trees or shrubs. The rose-trees, hop-plants, turnip, cabbage, bean, and many other plants are infested, each by a distinct species. The *A. rosa*, of the rose-tree; the bean *A. (A. fabae)*; the *A. humuli* of the hop; *A. brassicae* of the cabbage and turnip; *A. lanigera*, or woolly A. of America—the American 'blight' of apple-trees—are all familiar species of these insects. The hop crop, indeed, dates its yearly uncertainty, failure, or success from the more or less destructive effects of these pests. The potato *A. (A. vastator)* is another familiar form. Green is a common colour among plant-lice, the A. of the bean being coloured black. The aphides exemplify in a remarkable manner the reproductive phenomena, known under the name of Parthenogenesis (q. v.) Winged males and females are thus produced in the autumn. These copulate, and produce eggs which lie dormant all winter, but develop into *female* forms only, in the ensuing spring. These wingless females, or 'fruitful virgins' as they are called, produce living young without the influence of the *male*, their offspring being invariably wingless, and as invariably female in sex. This second generation of 'fruitful virgins' similarly produce young viviparously, without access to the males, the young being as before wingless, and females. As many as ten or eleven generations of a similar kind will thus be produced; until, when the succeeding autumn comes round, *males* and *females* appear in the last brood of the 'fruitful virgins,' and these males and females produce eggs from which, in the succeeding spring, fertile virgins will again be produced. *Parthenogenesis* thus means the development or production of new individuals from females which have had no copulation with males.

Apho'nia. This term means loss of voice, either complete or partial. Voice is produced by vibrations of two thin folds of membrane in the larynx termed the vocal cords. The larynx is a structure composed of cartilages more or less movable on each other by the action of muscles which are supplied with nerves. Any disease affecting this mechanism causes more or less loss of voice. When the nervous supply is interfered with, A. is termed functional; when the vocal cords are thickened by inflammation, or by tumours or warty growths, the disease is said to be organic. The diagnosis of the disease is made by means of the Laryngoscope (q. v.), by the aid of which the cords can be examined. The treatment depends on the cause. If due to catarrh or cold, as in common hoarseness, a mustard plaster to the throat may be beneficial; if due to tumours or growths on the cords, these must be removed; if caused by chronic inflammation and ulceration, the application, by means of a brush, of a strong solution of nitrate of silver (40 grains to the ounce) is beneficial. In

advanced cases of phthisis, patients lose their voice from tubercular ulceration of the larynx. Such cases are hopeless. A variety of A., known as *dysphonia clericorum*, or clergyman's sore throat, is common amongst public speakers of all classes. It is sometimes nervous, but usually is caused by congestion, inflammation, or relaxation of the mucous membrane of the larynx, produced by excessive use of the organ. Rest, change of air, and the local application of nitrate of silver, is the best treatment in these cases.

Aphorism (Gr. *aphorismos*, a definition), a short, pithy saying, comprehending an important truth; as, 'Delays breed remorse.'

Aphrodisiacs are medicines which excite or increase the sexual powers. Many substances said to have this effect have no specific action on the sexual organs, but merely excite the imagination. Such substances are musk, castoreum, ambergris, the allyl oils, obtained from Cruciferous plants, such as the onion, leek, horse-radish, &c., and opium and Indian hemp. Cantharides and turpentine occasionally excite the genital organs; but the only true sexual stimulants are those which promote the healthy nutrition of the tissues, such as iron, quinine, phosphorus, nux vomica, and strychnine. See ANAPHRODISIACS.

Aphrodite, the Greek name of the Goddess of Love, whom the Romans called Venus, under which heading the origin and development of the myth will be traced. The name A., also in poetry *Aphrogeneia*, is Greek, and means 'foam-born,' because the goddess was said to have sprung from the bright foam of the sea. Her festivals, named *Aphrodisia*, included impure mysteries, the main actors in which were prostitutes.

Aphrodite, a genus of worms belonging to the order *Errantia* of the Annelidan class (see ANNELIDA), which genus includes those forms popularly known as 'sea-mice.' These worms possess somewhat oval bodies, the jointed back being covered with a double row of overlapping scales or plates, termed *elytra* or *squamæ*. Beneath these plates the gills are contained, and water for the purpose of breathing is admitted and expelled by the elevation or depression of these plates. The upper part of the digestive system can be protruded like a proboscis. The head is small, and pointed with eyes and tentacles. The bristles or setæ fringing the body are of large size, and exhibit the most gorgeous iridescent hues and metallic lustre, rendering the sea-mice objects of exceeding beauty. *Aphrodite hispida* is a familiar species.

Aphthæ is the name given in medicine to the disease called *thrush*. It consists of small, round, white specks or elevations scattered over the tongue and mucous membrane of the mouth. The disease occurs specially in infants, but occasionally it may be seen in old persons, when it is usually associated with a grave disorder of the alimentary apparatus terminating in death. In some forms of A. minute filaments and spores of microscopic fungi are found—the *Leptothrix buccalis* and *Oidium albicans*. The treatment consists of cleanliness, and the application to the lining of the mouth of borax mixed with honey or glycerine.

Apia'cese, another name for the natural order *Umbellifera* (q. v.)

Ap'ary. See BEE.

Apic'ius, Marcus-Gabius, a Roman epicure who flourished under Tiberius. His inventive faculty in the culinary art was exhaustless. Having squandered upwards of £800,000 in ministering to his ruling passion, and fearing that, having only £80,000 left, he should have to be content with common fare, he hanged himself. Two other persons of this name are mentioned in history, one of whom lived in the time of Pompey, and the other in the time of Trajan. The Roman cookery-book *De Arte Coquinaria, seu de Obsoniis et Condimentis*, though bearing the name of A., was not written by any of the three, but by a certain Coelius, who judiciously prefixed to his composition the name of the greatest gourmand of antiquity. It was edited by Liater (Lond. 1705), Almelooven (Amst. 1709), and Bernhold (Ansb. 1787-91).

A'pion, a Greek grammarian who flourished in the first half of the 1st c. A.D., was born at Oasis, in Libya, and studied at Alexandria under Apollonius, who inspired him with a love for Homer. He subsequently taught rhetoric at Rome,

and from his loquacity and boastfulness was called by Tiberius 'the cymbal of the world.' His works are now almost completely lost. He wrote a work on the text of Homer which attained considerable reputation and authority, and works on Egypt, and against the Jews. This last work brought him under the notice of Josephus, who attributes his death to a disease the result of debauchery. From his book on Egypt, Aulus Gellius has drawn his world-famous story of *Androctus and the Lion*.

A'pis (Egypt. *Hapi*, a name doubtless connected with Hapi, the Egyptian name for the Nile), the bull of Memphis, an Egyptian god, the symbol and visible incarnation of Osiris (q. v.). Two sanctuaries and a large court were set apart for him in the temple of Ptah, where he gave oracles, and received the homage of his attendants. The new-born bull, that was really A., was discovered by certain marks: according to some, four; according to others (Ælian, for example), as many as twenty-nine. All, however, agree as to the following signs: The animal must be black, have a white triangular spot on its forehead, a white crescent-shaped spot on its right side, and a knot resembling a beetle under its tongue. The days of his discovery and birth were festivals; the day of his death filled Egypt with woe. He was not permitted to live longer than twenty-five years. When he reached this age, he was secretly put to death, and buried in a sacred well. If he died earlier, he was solemnly buried in the Temple of Serapis. His worship was certainly at first connected with the sacred river, for the *Apis Natalis*, or annual festival of the discovery of the god-calf, coincided with the rising of the waters of the Nile. Later on A. was merely the animal sacred to Osiris, who himself was called, according to Strabo, 'the bull of the under-world.' Still later he became 'one and the same with Osiris himself;' and last of all, when it was sought to etherialise the nature-worship of the land, the myth of A. was twisted to symbolise the astronomical and physical systems of the Egyptians.

A'pis. See BEE.

A'pium, a genus of Umbelliferous plants. See CELERY.

Ap'acent'al Mamma'lia, a name applied to the two lower orders of mammals (*Monotremata*, represented by the ornithomyrmec and echidna; and *Marsupialia*, represented by the kangaroos, opossums, &c.) on account of the young of these forms being unconnected with the mother before birth, by means of a *Placenta* (q. v.) or 'after-birth.' All mammalia, other than those included in the two above orders, possess such a vascular connection with the mother, and are hence termed *placental* mammals.

Ap'ana'tic Lens (Gr. *a*, without; *plane*, deviation) is a lens so constructed as to be quite free from spherical aberration. See ABERRATION.

Aplys'ia, a genus of Gasteropodous mollusca, popularly known as the 'sea-hares,' and forming the type of the family *Aplysiade*. This family belongs to the *Opisthobranchiate* Gasteropoda, or those in which the gills exist towards the rear of the body. In the *Aplysiade* the animals are slug-like; the shell being rudimentary, and concealed beneath the mantle. The tentacles are very large, and are turned backwards like ears, whence the suggestion of the popular name of sea-hares. These forms feed upon seaweeds, and are common around the coasts of Britain. They emit a fluid, coloured purple or violet, from the mantle, when they are irritated. This fluid was formerly thought, but erroneously so, to be poisonous in its nature; the ancients using these forms in their spells. *A. depilans*, *A. inca*, &c., are familiar species.

Apnœ'a is the name given to the sensation of want of breath. Its cause is probably due to the presence of an excess of carbonic acid in the blood, which acts on the nervous centres governing respiration. Great difficulty in breathing in disease is called dyspnœa, and if a patient can breathe only when the body is erect, the condition is termed orthopnœa.

Apoc'alypse. [See REVELATION OF ST JOHN.]

Apoc'alyp'tic Number. See ANTICHRIST.

Apocarp'ous, a term applied in botany to fruits consisting of a single carpel, as in the pea; or several carpels disunited, as in the columbine.

A Poco a Poco (Ital.), 'little by little,' a musical term.

Apocryphal Scriptures, or the Apocrypha. 1. *The name.* The Gr. *apocrypha* means properly 'hidden, secret,' then 'spurious.' The use of the word came first into vogue among the heretical sects of the early Christian Church, who applied it to various books which they asserted were the productions of certain holy personages, whose names they bore, and had been obtained by means of a secret tradition. The name was retained by ecclesiastical writers, partly with the sense given to it by the heretics themselves of *secret* and *mysterious*, but also with a scornful sense of *spurious* (i.e., not written by their alleged authors) and *heretical*. The modern meaning, 'uncanonical,' dates properly, as will appear, from the age of the Reformation.

2. *Their history.* The Hebrew Canon, which was strictly preserved by the Jews in Palestine, was identical with that of our authorised version. But among the Greek-speaking Jews at Alexandria and elsewhere, the limits of the Canon had not been exactly fixed. In the Greek translation of the LXX. several books of the Hebrew Canon received additions, several later books not in the Hebrew Canon were translated, and others were written in Greek. In the Christian Church, from ignorance of Hebrew, the LXX. came to be almost universally used, or, in the Western Church, a Latin version made from it; and thus the practice arose of using, as sacred and canonical, books which had no place in the Hebrew Canon. Still, attempts were made to form more definite views about the Canon (q. v.) The Greek Church, at the Council of Laodicea (360 A.D.), decided to exclude the A. altogether. In the West, one section of the Church wished the A. included in the Canon, and at the Council of Carthage (397 A.D.) a decree was passed making some of them at least canonical (Wisdom of Solomon, The Wisdom of Jesus, Tobit, Judith, and the two Maccabees); while another section, headed by Jerome, held them to be inferior to the other books, but deserving to be read in churches for the edification of the people. The question thus remained undecided for the whole Church till the Reformation. The Roman Catholic Church, by a decree of the Council of Trent, classed the A. along with the canonical books as all deserving of equal authority, with the exception of the Prayer of Manasses and the two books of Maccabees. The Protestant Churches unanimously adopted the pure Hebrew Canon; only, Luther published the A. along with his Bible as books 'which are not of like worth with Holy Scripture, yet are good and useful to be read;' an example which was followed by the Church of England. The Calvinistic Churches have treated the matter more strictly, and by them the A. S. have been altogether ignored.

The name A. is also given, but less accurately, to a class of writings which arose out of the canonical literature of the New Testament, and which concern themselves mainly, though not exclusively, with the history and doctrine of the new religion. They are divisible into three heads: (1) The A. Gospels; (2) the A. Acts of the Apostles; (3) the A. Revelations or Apocalypses. None of these have ever obtained canonical recognition, and it is impossible to speak positively regarding their age or their authors. Most of them exist only in mediæval MSS.; but it is pretty clear from internal evidence that they were composed at a very early date. Of the twenty-two A. Gospels, the most important are *The Protevangelium of James*, *The Gospel of Thomas*, *The Gospel of Mary*, *The History of Joseph the Carpenter*, and *The Acts of Pilate*. Some of these may reach back to the 2d c.; at any rate, from the 4th c. down, allusions and references to particular incidents recorded in them are numerous. Some critics think the A. Acts of the Apostles are, in their first form, of earlier origin than the A. Gospels. Origen and Tertullian seems to have been familiar with books of this description, and mention some of them by name, which may, or may not, however, have been identical with what we now possess. Of the thirteen documents thus classified, the chief are *The Acts of Peter and Paul*, *The Acts of Barnabas*, *The Acts of Philip*, *The Acts of Andrew*, *The Acts of Thomas*, *The Martyrdom of Bartholomew*, and *The Acts of John*. Regarding the A. Revelations, it is still more difficult to pronounce an opinion. The MSS. are characterised by extreme variety of readings, and the text is occasionally very corrupt. The most important and interesting are *The Apocalypse of Moses* and *The Apocalypse of Esdras*, the first of which belongs rather to Old Testament literature; *The Apocalypse of Paul*, *The Apocalypse of John*, and *The Assumption of Mary*.

If the A. writings of the New Testament are not to be received as veracious records of literal facts, they are yet deeply interesting and instructive. We see in these crude performances the natural growth of a vast religious romance, encircling, as with a magic halo, the lives and characters of men whose real exploits had changed the face of the world, and stirred the admiration and the awe of a converted empire. See Tischendorf's *Prolegomena* to the A. literature of the New Testament (Leipzig, 1873), and Clark's *Anti-Nicene Christian Library*, vol. xvi. (Edin. 1870.)

Apocynaceæ, a natural order of Dicotyledonous corollifloral plants, embracing about 100 genera and 600 species, the most of which are natives of tropical countries. Some of the plants in the order yield edible fruits, others are used medicinally, while many of them are very poisonous. One of the most deadly is *Tanghinia venenata*, the seeds of which supply the famous Tanghin Poison (q. v.) The oleander (*Nerium oleander*), common in the S. of Europe, is also poisonous in all its parts. Death has resulted from eating its flowers. *Tabernamontana utilis* is the Hya-hya or Cow-Tree (q. v.) of Demerara, the juice of which is used as milk. *Urceola elastica*, *Vahea gummiifera*, and others, yield Caoutchouc (q. v.) *Wrightia tinctoria* yields a dye like indigo. Two species of Periwinkle (q. v.) (*Viola major* and *minor*), found in Britain, are astringent and acrid. *Allamanda cathartica*, and others, are emetic and cathartic. *Apocynum cannabinum*, called Canadian hemp, yields a strong fibre.

Ap'oda, 'footless,' a term applied in zoology to various groups of animals to indicate the absence of the fore or hind limbs, or their homologies. Thus certain cirripedes (barnacles, &c.) among the Crustacea are termed A., from the absence of the cirri, which represent the limbs of other crustaceans. Certain fishes (e.g., sand-eels, eels), in which the ventral fins are absent, are termed A. The blind worms or *Ceciliada* (Amphibia), in which feet are undeveloped, were formerly termed A.

Ap'ogee (Gr. *apo*, from, and *ge*, the earth) denotes generally the furthest distance of any heavenly body from the earth; but is now restricted in its application to the distances of the sun and moon. The shortest distance of these bodies from the earth is called the *perigee*.

Apol'da, a town in the grand duchy of Saxe-Weimar, Germany, on the Werlitz, 8 miles N.E. of Weimar. It is the industrial centre of the grand duchy, has extensive stocking manufactures (there are over 1100 looms), and is a station on the Thuringian Railway. Pop. (1872) 10,507. The castle of A., together with a certain amount of landed property, was presented in 1633 to the University of Jena, in whose possession it still remains.

Apollina'ris, the Younger, son of A. the Elder, a presbyter of Laodicea, was, according to Jerome and Rufinus, Bishop of Laodicea in the latter part of the 4th c. From him the heresy styled Apollinarianism takes its name. He denied that Christ had a rational human soul, affirming that its place was supplied by the divine *Logos* or Word. As this seemed a denial of the true human nature of Christ, it was repeatedly condemned—by the Council of Alexandria in 362, by councils at Rome in 375 and in 378, and by the Œcumenical Council of Constantinople, 381—but the heresy extended widely over Syria. After the death of A., between 382 and 392 A.D., his followers formed two sects, the Vitalians and the Polemeans; the latter of whom, regarding the divine and human natures of Christ as blended into one substance, were styled *synousiastoi*. They were also accused of *sarcolatry* (flesh-worship), and of *anthropolatry* (man-worship), because they deemed the two natures so intimately blended that the spiritualised body was a legitimate object of adoration. Apollinarianism was entirely prohibited by imperial command in 428 A.D. Of the numerous writings of A. there only remain a paraphrase of the Psalms, in Greek hexameters, first published at Paris in 1552, and fragments of a commentary on St Luke, printed by Angelo Mai in his *Classici Auctores* (Rome, 1827).

Apollo, one of the great divinities of the Greeks, was, according to Homer and Hesiod, the son of Zeus ('the Sky') and Leto ('Shadow' or 'Darkness'), though no birthplace is noted, unless an epithet of Homer, the meaning of which is disputed, may be taken as implying that he was 'born in Lycia.'

Of the various beliefs of later times in reference to this point, the most popular and generally received was that, with his sister Artemis, he was born in the island of Delos. Both Lycia and Delos, it may be noted, signify the 'land of light.' Leto, it was said, driven from land to land by the jealousy of Hera, at last found shelter in Delos, where she brought forth A. and Artemis under a palm at the foot of Mount Cynthus. The youth A., fed with nectar and ambrosia by Themis, called at once for a lyre and bow, declaring that henceforth he would reveal to men the will of Zeus. Powers apparently differing in kind are ascribed to A., but they are really separate manifestations of one and the same power. For example, A. punishes the wicked, as the god that bears the bow and arrows (hence, according to some, his name A., 'the destroyer,' though the solar mythists explain it as meaning that the sun's rays, when powerful, can destroy the life of animals and plants); consequently he is also the helping god. Then he is the god of prophecy, song, and music, deriving his prophetic powers from Zeus, and communicating the prophetic gift to gods and men, while he cheers the feast of the gods with his phorminx. Again, he is the protector of flocks and herds; and finally, he founds cities and establishes constitutions. On the view that A. and Helios, or the sun-god, are identical—and the later Greek poets made no distinction between them—these different attributes are seen to be duly connected. Where the worship of A. originated has been much discussed. Some are of opinion that it was introduced from Egypt. Otfried Müller, on the other hand, thought that A. as 'the averter of evil' was a Doric divinity, having the oldest seats of his worship at Tempe and Delphi, and that his worship was not introduced into Attica till the Ionian immigration. But all such conjectures are considered idle by the new school of comparative mythologists, headed in England by Max Müller and Cox, who trace back with surprising ingenuity most of the circumstantial details in the lives of the Greek deities to the misapprehension of the figurative language used by the older Aryans in reference to solar phenomena. For a special application of this new principle to the myth of A., see Cox's *Manual of Mythology*, pp. 48-55. The most famous oracles of A. in Hellenic lands were Delphi, where the Pythian games were held in his honour, Delos in the Ægean, and Claros and Patara in Asia Minor. The Romans introduced his worship as early as 430 B.C., but as they had no counterpart to this brilliant and variously-gifted divinity in their own mythic system, they were forced to adopt his Greek name also.

Apoll'o Belvedere, a famous statue found at ancient Antium in 1503, and placed by Pope Julius II. in the *Belvedere* of the Vatican, whence its name. The figure is nude, over life-size, and has long been regarded as the most beautiful type of manhood in existence. The artist is unknown, but the reign of Nero is fixed as the probable date of the work.

Apollodo'rus, an Athenian painter, flourished about 408 B.C., improved colouring, and invented chiaroscuro, hence the epithet of *Shiagraphos* (the 'shader') applied to him.—**A. of Damascus**, architect, put to death 129 A.D., by Hadrian, for indiscreet criticism of a design sent him by the emperor.—**A.**, a Greek poet, mythographer, and grammarian, flourished about 140 B.C. The *Bibliotheca* alone of his numerous works is extant. It gives a terse account of the Greek myths down to the heroic age. In 1782-83 Heyne published an edition of it at Göttingen, of which a second and improved edition appeared in 1803.

Apollo'nios.—1. **A. Dyscolos** ('ill-tempered'), of Alexandria, the first who systematised grammar, and so called by Priscian the *prince of grammarians*, belonged to the 2d c., and to the reigns of Hadrian and Antoninus Pius. Most of his works are lost. The first edition of those that have come down to us was published at Venice in 1495, the latest and best is that of Bekker (Berl. 1817). His son, Ælius Herodian, was as famous a grammarian as A. himself.—2. **A.**, son of Archelubus, author of a Homeric lexicon, still extant (of which a good edition was published by Bekker, Berl. 1833), born at Alexandria, and lived in the time of Augustus.—3. **A. Molon**, taught rhetoric at Rhodes, lectured at Rome, and was the teacher of Cicero.—4. **A. of Perga** (240 B.C.), a mathematician, known to antiquity as the 'Great Geometer,' was the author of numerous works, all of which are now lost, except a treatise on *Conic Sections*, part of which is in Greek, and part in

an Arabic translation. The best edition of the *Conic Sections* is that by Halley (Oxf. 1710).—5. **A. of Rhodes**, born about B.C. 235, instructed in his youth by Callimachus, though afterwards they cherished deep and mutual antipathy. The epic of A., styled the *Argonautica*, a work of labour rather than of genius, though not without many beautiful passages, which gracefully imitate the simplicity and naturalness of Homer, had many admirers among the Romans. The best edition is that of Wellauer (Leipz. 1828, 2 vols. 8vo), with various readings and short notes.

Apollo'nios, of Ty'ana, in Cappadocia, born four years B.C., a Pythagorean philosopher, half mystic, half impostor, who pretended to supernatural powers, and was commonly regarded as a magician. He travelled in Asia Minor, disputing upon divine rites, and twenty years later he consulted the Magi at Babylon on his road to India. In India he met with Jarchas, the chief Brahmin, from whom he received such instruction in things divine as induced him to claim miraculous powers and a knowledge of futurity. After much travel, in the course of which he mixed himself up with political movements, he was tried for participating in an insurrection against Domitian, but acquitted. His last years were spent at Ephesus as a teacher of the doctrines of Pythagoras, and here he died at the age of nearly 100. A. claims notice principally from the attempts made by Hierocles, in the 3d c., to set up his miracles as rivals to those of Christ—attempts renewed in England by Blount and Lord Herbert, and in France by Voltaire. The writings of A. were numerous, and a list of them has been preserved; but the only authentic one that has come down to us is the *Apology*, preserved by Philostratus, who wrote his life about two centuries after A. was dead.

Apollo'nios, of Tyre, the title of a Greek metrical romance, of which the original has been lost, though numerous mediæval versions and adaptations exist in most of the European languages. One of the very earliest was a version into the English of the 11th c. The adventures of A. himself, of his wife, and of his daughter, and of their happy reunion after apparently hopeless separation, are minutely described. There are no fewer than three Latin versions, one of which is printed in the *Gesta Romanorum*. This subject is treated by Gower in his *Confessio Amantis*, and by Shakespeare in his *Pericles, Prince of Tyre*. Three English stories, based on a French version of *A. of T.*, were published in 1510, 1576, and 1607. The Spanish version, which dates from the 13th c., was republished at Paris as late as 1842. The Germans possess the story in various forms, the oldest reaching back to the 13th or 14th c.

Ap'ologue, a fable or story, intended to convey some useful moral, differs from a parable, which must have an air of probability, in employing brutes and inanimate objects as the interlocutors. Æsop's fables are excellent examples of the A. See the A. of Jotham, Judges ix. 7-15. The A. has long been a favourite vehicle of instruction for the young, and is a favourite form of composition with Easterns.

Apology, now used as synonymous with excuse, was originally the title of a book defending certain opinions or doctrines, as Tertullian's *A. for the Christians*. Apologetic works were numerous in the early stages of Christianity; indeed, until Christianity became the religion of the empire in the 4th c. Certain eras have been marked by a greater eruption of the apologetic spirit than others, e.g., that of the revival of learning (15th c.), when Christianity and Platonism seemed to be in antagonism, and apologies were written defending revelation; and the period following the Reformation in England, when, freethinking having become fashionable, numerous apologies were published to prove the divine origin of Christianity. A distinct branch of systematic theology is now named *Apologetics*. Among the ancient apologists were Justin Martyr, Origen, Augustine, &c. Among the modern, the Protestant—Grotius, Butler, Paley, Watson, &c.; and the Roman Catholic—Pascal, Bergier, Chateaubriand, &c. The more recent apologists are Neander, Tholuck, &c., in reply to Strauss and others.

Aponeuro'sis is a term used in anatomy to designate the strong layers of fibrous or connective tissue which invest the muscles, and send septæ or partitions between them. A. are composed of white fibrous tissue mixed with a variable quantity of yellow elastic tissue. They serve as surfaces for the origin and

insertion of muscular fibres, and by special septæ they connect groups of muscles with the bones. They are found only in the limbs.

Aponogeton, a genus of aquatic plants belonging to the order *Juncaginaceæ*, *A. distachyon*, common at the Cape of Good Hope, and called there water



Aponogeton distachyon.

Uintjes, is a very handsome, fragrant species. It is a favourite plant in garden-ponds in Britain. When first introduced, it was grown in hot-houses for many years, until the discovery was accidentally made that it could endure the open-air temperature of this country. The spikes of fragrant flowers, and the flat oblong leaves, float on the surface of the water. Its flowering-tops are said to be used as a pickle, and as a substitute for asparagus at the Cape, and that its root (corm), which is about the size of a hen's egg, is roasted and eaten.

Apophthegm (Gr. *apophthegma*, an utterance), a sententious maxim, conveying an important truth. Proverbs are often in the form of the A. Among others, Plutarch in ancient, and Bacon in modern times, have made interesting collections of apophthegms.

Apophysis is a prominent elevation jutting out from the surface of a bone. If such an elevation is slender, it is called a spine; if blunt, a tubercle; if broader at the base, a tuberosity. It is to be distinguished from an epiphysis, which is a prominence having a separate centre of ossification.

Apoplexy is a name in medicine employed to designate an affection in which an individual suddenly falls down as if from a blow, and in which there is for a time a complete loss of consciousness, of sensation, and of voluntary motion, along with more or less of interference with the functions of circulation and respiration. There are three pathological conditions, to any of which this affection may be due: (1) To hæmorrhage into the substance of the brain, the result of rupture of a blood-vessel; (2) to plugging up of one of the larger arteries of the brain by a clot of blood, either formed at the spot (*thrombosis*), or carried to the spot from some other quarter (*embolism*); and (3) to congestion of a portion of the brain, or effusion of serous fluid causing pressure. Hæmorrhage into the substance of the brain is the result of disease of the cerebral vessels. The clot may vary in size from that of a pin-head to a hen's egg.

Certain persons are predisposed to apoplectic seizures. These are—(1) Those whose ancestors have died of A.; (2) those who live highly, follow sedentary habits, and have a peculiar configuration of body, namely, protuberant belly, large head, short, thick neck, and florid complexion; (3) those who suffer from disease of the heart, of the kidneys, or of the blood-vessels; (4) those who are intemperate.

An apoplectic attack may last from two or three hours to as many days. The respiration is slow, difficult, and snoring; there is frothy mucus about the mouth; the body is sometimes covered with a cold, clammy sweat; the face is pale; eyes dull and glassy; pupils widely dilated; teeth clenched; power of swallowing gone or impaired; bowels usually costive; urine passed involuntarily; absolute unconsciousness. These effects vary according to the severity of the attack. In many cases the coma may pass off leaving the patient well, or with impaired mind, or partial loss of power on one side of the body. In other cases consciousness never returns, and death ends the scene.

The severity of the attack depends on the part of the brain affected. If bleeding take place in the substance of the *Pons Varolii* or *Medulla oblongata* (see BRAIN), speedy death (within a few hours) is the result; but if it happens in the grey or white matter of the cerebral hemispheres, there may be partial recovery of consciousness, and of the power of voluntary motion. This

may continue for several months, or, in rare cases, years; but, sooner or later, another attack occurs, which makes matters worse, while a third almost invariably terminates life.

The treatment may be divided into (1) what is to be done to prevent an attack in those predisposed to it; and (2) what is to be done when an attack has occurred. The preventive treatment is a quiet life in every sense of the term, freedom from excitement or worry, mild diet, abstinence from alcoholic drinks of all kinds, sleep in a well-ventilated room on a mattress with a high pillow, application of cold water to the head daily, and regulation of the bowels so that they never become constipated. Should an attack unfortunately occur, place the patient on his back in bed, with a high head, apply cloths dipped in cold water to the head, remove all tight parts of the dress, more especially about the head or neck, and if the power of swallowing be not lost, give two or three drops of croton oil. Bleeding, as a rule, does no good, and should never be done except by a medical man. If the patient recover from the fit, great care must be taken to prevent the recurrence of another. Everything, either mental or physical, of an exciting nature must be avoided, and the diet must be nutritious and light. No wine should be taken. With care, a second or third attack may be ward off for a considerable time; without care, it will very speedily supervene in a worse form.

Apostate, a term originally applied to one who abandoned his faith from any motive whatever, even from conviction—for instance, the Emperor Julian. In the early Church apostates to heathenism were styled *sacrificati* if they notified their change of faith by offering sacrifices to the gods, and *thurificati* if they offered incense to them. It was a question seriously and even passionately discussed what should be done with those called *lapsi* ('fallen away') when the storm of persecution had blown over, and they sought readmission to the Christian Church. Some thought that since they had in a moment of supreme trial denied their Lord, they could never 'be renewed again unto repentance,' and so ought not to be readmitted. In the Roman Catholic Church the A. was excommunicated, his property confiscated, and even the extreme penalty of death was sometimes inflicted.

Apostle (Gr. *apostolos*, one sent), a messenger generally, but in the New Testament applied specially to the twelve disciples chosen by Christ, 'whom also he named apostles; Simon Peter, Andrew, James and John, Philip and Bartholomew, Matthew and Thomas, James the son of Alphaeus, Simon Zelotes, Judas the brother of James, and Judas Iscariot' (Luke vi. 13-16). To these were subsequently added Matthias, chosen by lot in place of Judas Iscariot (Acts i. 26), and Saul of Tarsus, afterwards termed Paul, miraculously chosen (Acts ix. 15). It was essential to the office of an A. that he should have seen the Lord. This is laid down in Acts i. 21, 22, and confirmed by Paul (1 Cor. ix. 1), 'Am I not an A.? have I not seen Jesus Christ our Lord?' The mission of the apostles was to preach the gospel; the sphere of their labour, at first restricted to the Jews, was afterwards extended to all nations. Episcopal Churches contend that the office of A. is perpetuated in bishops, while non-Episcopal Churches hold that the apostles having a strictly unique work to do, for which they were accredited by the possession of miraculous powers, had, and could have, no successors.

Apostles' Creed. See CREED.

Apostolic, or **Apostolical**, pertaining to the apostles, a term very variously applied. *A. Church*, and *A. See*, are titles assumed by the Roman Catholic Church on account of its having been founded by St Peter, whose successor the Bishop of Rome claims to be. *A. succession* denotes both an unbroken transmission of holy orders from the apostles through a succession of bishops, and a ministry whose ordination gifts them with A. powers and privileges. The questions have excited much controversy between the Roman and Protestant Churches; and in Protestant Churches between Episcopalians and Presbyterians. The *A. chair* is the chair of the Pope as the successor of Peter; the *A. Council* is that held at Jerusalem (Acts xv.), date not certainly fixed, to determine disputes raised at Antioch; the *A. Vicar* is the cardinal representing the Pope in extraordinary missions; and *A. tradition* is that which is asserted to have been handed down from the apostles. A papal brief is styled *A.*, and so are the months January, March, May, July, September, and

November, because in these the vacant German benefices were appropriated by the Pope, in virtue of the Vienna Concordat of 1448. The council charged with the superintendence of the pontifical revenues is also called the *A. Chamber*.

Apostolic Canons and Constitutions, the titles of works both ascribed to Clemens Romanus. Few scholars, if any, however, now believe that they belong to a period so early as that to which Clemens Romanus is assigned, or that they are in any sense apostolic. Krabbe, in his *Essay* on this subject (New York, 1848), endeavours to show that of the eight books of the *Constitutions*, the first seven, containing rules for the Christian life, date from the close of the 3d c., and that the eighth, a guide to the priests in performing the sacred offices, belongs to the end of the 4th or the beginning of the 5th c. The *Canones* was a later production. The first fifty, dating from the middle of the 5th c., were accepted by the Latin Church, while the Greek Church adhered to the thirty-five canons promulgated at the commencement of the 6th c. This produced contention between the Churches. Bunsen, in his *Christianity and Mankind* (Lond. 1854), arrives at similar conclusions. The *Constitutions* have been edited by Netzen (1853), and Lagarde, in Bunsen's *Analecta Ante-Nicana*, vol. ii. (1854). The English translation of Whiston has been reprinted with alterations in Clark's *Ante-Nicene Library*, vol. xviii. (1870).

Apostolic Catholic Church, the name chosen by a religious denomination popularly known as Irvingites (q. v.)

Apostolic Fathers, those Christian writers who had personal intercourse with the apostles. Of only three can this be affirmed with anything like probability—Clemens Romanus, Polycarp, and Papias. Barnabas, Hermas, and Ignatius are sometimes ranked as A. F.; but there is no satisfactory proof that Barnabas, the friend of Paul, wrote the epistle bearing his name; that the Hermas of Rom. xvi. 14 wrote the *Pastor*; or that Ignatius wrote the letters attributed to him. Archbishop Wake and Mr Chevallier have published translations of the A. F., but more accurate and valuable translations have been made by Drs Donaldson, Roberts, and Crombie in vol. i. of the *Ante-Nicene Library* (Clark, Edin. 1867).

Apos'trophe (Gr. a turning away), a figure of rhetoric in which the speaker *turns away* from his general musing or meditation to address specifically the dead or absent, and even inanimate objects—e.g., (1) 'Departed spirits of the mighty dead'; (2) 'Ye stars, which are the poetry of Heaven.' A. has been a favourite figure with the more impassioned poets and orators of all ages. In grammar, the comma marking the omission of a letter, as in *o'er* for *over*, is called an A.

Apothecary. This name was formerly given in England to the general medical practitioner. It was not till the reign of Henry VIII. that the various branches of the medical profession came to be clearly divided. The physicians were incorporated in 1518; surgeons in 1540. On 9th April 1606, apothecaries were incorporated by James I., along with the Company of Grocers. They had meanwhile, however, notwithstanding these charters, continued to act as physicians and surgeons. According to legal decision, they were then entitled to charge their patients either for the medicines supplied or for attendance, but not for both. The legal recognition of the A. having a right to practise of course exempted him from legal responsibility for the results, unless his treatment showed flagrant ignorance or carelessness. These privileges belonged in England solely to the licentiates of the Apothecaries' Society of London, and in Ireland to the licentiates of the Apothecaries' Hall of Ireland, though many practised without the licence. The Medical Act of 1858 has further improved the position of the apothecaries. They are entitled to be registered as licentiates in medicine, registration giving the right to practise medicine throughout the British empire, to charge for their visits and professional advice, and for medicine and medical appliances supplied by them. The Pharmacy Act of 1868 has further widened the distinction between the A. and the ordinary Chemists and Druggists (q. v.) It still, however, allows the A. to keep a shop for the sale of medicine, and to make up his own prescription. It has been held in England, by the inferior courts, that no other medical practitioner than an A. can recover the price of medicine supplied to a patient; but as there has not hitherto been any appeal to the Supreme Court on the question, it cannot be held as so settled.

Licences are granted by the Apothecaries' Society of London, and by the Apothecaries' Hall of Ireland, on much the same conditions as are required by the other authorities granting medical qualifications. The London Society and the Irish Hall each appoint a member of the General Council of Medical Education and Registration. The privileges of both were expressly preserved by the Medical Act of 1858; but the Irish apothecaries do not seem to have established their rights as medical practitioners to quite the same extent that they have done in England. A provision of an Act under George III. gives a monopoly to licentiates of the Irish Hall in the compounding and selling of medicines; but the provision seems to be neutralised by those of other Acts relating to chemists and druggists. The English Hall has done what no other licensing medical corporation in the United Kingdom has done—it has granted a licence to a woman to practise medicine; henceforth, however, this will be impossible, owing to a change in the by-laws.

An Act of George III. provides for the efficient supervision of apothecaries' shops, and imposes penalties for keeping any in an unwholesome condition.

In Scotland an A. is not a medical practitioner. He merely sells medicines, corresponding to what in England is called chemist and druggist.

Apothecia, the term applied in botany to the shield-like fructification of *Lichens* (q. v.)

Apothéosis, a Greek word signifying precisely the same as the Lat. *aificatio*, deification, or enrolling a mortal among the gods, was applied most commonly to the elevation of a deceased Roman emperor to divine honours—an act, however repugnant to modern ideas, quite in harmony with the ancient Roman *cultus*. The ceremony (*consecratio*) consisted in the burning of the body, and at the same time letting loose an eagle to convey the soul to heaven. Of the medals struck on these occasions, sixty separate examples have been preserved.

Appalachians, sometimes called the Alleghanies, the general name given to the mountain system which runs nearly parallel to the Atlantic seaboard from the State of Maine to the borders of Alabama, a distance of about 1200 miles. It does not consist of a single unbroken chain, but is made up of various parallel ridges, which are known by different names. Beginning at the N., we have the White Hills of New Hampshire, of which Moosehillock and Washington are respectively 4636 and 6634 feet high; the Green Mountains in Vermont, reaching in Killington Peak an elevation of 3924 feet; the Highlands on the E. of the Hudson, and on the W. the Catskill Mountains, of which Round Top, the highest peak, is 3804 feet above the sea; the Kittatinies, stretching from New Jersey to Virginia; the Blue Mountains, a parallel range to the E. of the last, and extending as far S. as N. Carolina; and lastly, more to the westward, the range of the Alleghanies proper, in Pennsylvania, Virginia, and the N. of Georgia and Alabama, and the Cumberland Mountains on the E. of Kentucky and Tennessee.

There is no single range in this system which could be mentioned as the true watershed, for the rivers which have their source among the mountains usually flow for a considerable distance along the valleys which lie between the different ranges, and then cut their passage through the hills so as to join the Mississippi or St Lawrence on the W., or the Atlantic on the E. The distance of the Atlantic from the most eastern of the A. varies considerably. At the Hudson the ocean almost washes the base of the hills, while from N. Carolina to Florida the breadth of the slope is 200 miles. On the W. there is a gentle but broken descent to the Mississippi, the breadth of the country from the river to the most western of the ranges being about 300 miles.

With regard to geological formation, a considerable portion of the northern tracts is occupied by Primary strata—such as gneiss, mica-slate, clay-slate, and granular limestone, frequently associated with granites and traps. In the mountains proper, however, sandstones, slates, and transition limestones are much more abundant. Coal, sandstone, and slate are found in Pennsylvania, the coal being of the kind known as anthracite or blind coal. Beds of bituminous coal are obtainable high up in the Alleghanies of Ohio. The Secondary formations of Europe, between the coal measures and the chalk, are of rare occurrence. The country between the mountains and the Atlantic is covered

for the most part with Tertiary deposits, in the alluvial accumulations above which are found remains of the mastodon and megatherium. The formation of the A. dates from a period posterior to the Carboniferous epoch, and anterior to the Jurassic era, for the strata, including the coal measures, are the newest upturned beds associated with the Appalachian range; while on the eastern base of the mountains there is a series of red sandstone beds, belonging to the Jurassic period, which are unconformable with the upturned strata, and which, consequently, must have been deposited after the upheaval of the range. Of unstratified rocks there occur granites, syenites, and serpentines, together with columnar basalts and other traps.

Large beds of different kinds of iron ore are found in various formations throughout the range; and in Pennsylvania and Ohio there are important iron-works. Lead, gold, copper, and nickel also occur, the two last in not inconsiderable quantity among the Paleozoic formations.

Appalachicola, a river of the United States, rising near the Appalachian range in the N. of Georgia, and flowing S. into the Gulf of Florida, after a course of about 400 miles. During the larger part of this course it bears the name of Chattahoochee, and forms the boundary between Georgia and Alabama; but after the confluence of the Chattahoochee and the Flint on the borders of Florida, the united waters take the name of A. The river is navigable for steamers up to the point of confluence, a distance of 70 miles. At its mouth lies the town of A., with a pop. (1870) of 1129, and a large export trade in cotton.

Apparent Magnitude of a body is an angle subtended at the eye by the diameter of the body. It is the notion which a body seems to us to have, from the position of our own eye. The A. position of a star differs from the true position owing to the effect of various physical phenomena, such as atmospheric refraction, aberration, parallax, &c., and for which, a corresponding correction must be made.

Apparitions. History and popular experience show that there has existed from remote ages a belief in the existence, especially among less civilised nations, of a host of the spirits of departed ones frequently present themselves to the bodily vision of living relatives or friends. There are many records of such, but it is doubtful if there have ever been more than one individual to whom the apparition was visible at one time. Many cases are easily referred to an over-excited brain, a strong imagination, or some bodily malady. Every one is more or less capable of receiving the appearance of some object previously seen, or even of forming a combination of physical objects which was probably never before observed by any one. Artists possess with a perfection, have this faculty in a marked degree; and the only difference between this and the appearance of A. seems to be that the one is voluntary and the other involuntary. The case of Nicolai, a Berlin bookseller, is well known; and he himself referred the appearance of these spectral images, which were visible to him for several months, to the condition of his bodily health during that period. Sir Walter Scott, in his work on *Demonology and Witchcraft*, gives, among other instances, that of a gentleman who died from the great mental agony which he suffered on account of the continual presence of a human skeleton, which appearance his reason told him was nothing but the product of his imagination. The appearance of the murdered Cæsar to Brutus before the battle of Philippi was perhaps the consequence of Brutus's recollections of his former friend's kindnesses, and the evident failure of the scheme for securing the liberty of Rome. Another curious and well-authenticated anecdote is in connection with Sir Charles Lee's daughter, who is said to have died at the exact hour which she previously told had been predicted by her mother's spirit the preceding night. Possibly she was so convinced that the prediction would come true, that her feelings became more intensely excited as the time drew near, and just as she heard twelve strike, the excitement proved too much for her brain, and she expired. The fact that great excitement may produce death has been fully authenticated in many instances.

Until psychology has been more fully studied, however; until the action of the brain, the extent of the sphere of its action, as to whether minds may act and react upon each other, though separated by a considerable distance, the phenomena of dreaming, and kindred subjects, are more fully investigated and under-

stood, we cannot hope for a satisfactory theory or solution of what are called A.

Appeal, in law, signifies the removal of a suit from one court to a higher, that the latter may affirm, reverse, or alter the judgment of the former. In England, A. is competent from the inferior courts of record to the Queen's Bench; and the writ of error from the Queen's Bench or Common Pleas is returnable into the Exchequer Chamber, thence to the House of Lords, whose judgment is final. In criminal cases, the judgment of lower tribunals may be reversed by writ of error. There are also appeals in equity, in bankruptcy, and from the summary convictions of magistrates. All appeals are subject to regulations as to security for costs, bail, and deposits. In Scotland, judgments of the Sheriff-Substitute may be appealed against to the Sheriff-Principal, from whom an A. may again be made to a Lord Ordinary of the Court of Session, whose judgment is subject to review by the 'Inner House'—consisting of two divisions, with three judges in each—of the Court of Session. Under certain restrictions, A. may again be made to the House of Lords, whose judgment, as in England, is final. Under the Supreme Court of Judicature Act of 1873, which makes many important alterations in the legal administration of England, it was proposed to constitute a new supreme 'Court of A.' of the House of Lords, for the United Kingdom. This part of the bill of 1873 did not become law; but under a bill now (1875) before Parliament, it is still intended to carry out this provision. Under the bill of 1873 the new Supreme Court would have consisted of, *ex officio*, the Lord Chancellor, the Lord Chief-Justice of England, the Master of the Rolls, the Lord Chief-Justice of the Common Pleas, and the Lord Chief-Baron. Her Majesty was empowered to appoint certain other English, Scotch, Irish, and Colonial judges, to the proposed new Court of A. of the House of Lords. The scheme is, however, meeting with strong opposition in Scotland, mainly on the ostensible ground of its being contrary to a clause of the Treaty of Union with England.

Another Supreme Court of A. is the *Judicial Committee* of the Privy Council. Appeals to this court may be made from the Admiralty and Ecclesiastical Court, and from the courts of the British colonies and dominions abroad. See **PRIVY COUNCIL**, **JUDICIAL COMMITTEE OF**.

Appenzell, a canton in the N.E. of Switzerland, encircled by that of St. Gall, is mainly mountains with numerous small valleys. Its highest point is Mt. Säntis, 8232 feet high, and it is intersected by the river Sitter. There are two divisions—Ausserrhoden, entirely Roman Catholic, and Innerrhoden, exclusively peopled by Protestants, of which the last is by far the more populous, forming, indeed, one of the most densely-peopled districts in Europe. This division has existed since 1597. Both the Catholics and Protestants have separate, but purely democratic constitutions. The chief industries are agriculture, and the manufacture of cotton and embroidery. Area, 152 sq. miles; pop. (1870) 60,635.—A., the capital (pop. 3686), lies on the Sitter, and has some trade in linens.

Ap'perley, Charles James, a notable English hunter and writer on sporting subjects, was born in Denbighshire in 1777, educated at Rugby, and after a lengthened career devoted to the pleasures of the chase, and marked by habitual extravagance and frequent impecuniosity, died in France, 19th May 1843. The best of his clever and chatty performances, *The Chase, the Turf, and the Road*, appeared in the *Quarterly Review* (1827).

Appert, Benjamin Nicolas Marie, a philanthropist of France, born at Paris in 1797. At the age of eighteen the desire seized him to devote himself to a life of practical benevolence. From 1816 to 1830 he was principally engaged in establishing army, orphan, and penitentiary schools. In 1846 he visited Belgium, Germany, and Austria, everywhere inspecting schools, prisons, and hospitals, and has published the result of his investigation in several valuable works, of which may be mentioned his *Voyage en Belgique* (Brun. 1846); *Voyage en Prusse; Hambourg, ses Prisons et Hospices* (1850); *Les Prisons, Hôpitaux, Écoles en Autriche, en Bavière, &c.* (Leipz. 1851.)

Ap'pétite is a sensation referred to the stomach. When the sensation is intense enough to be pleasurable, it is called A.; but

when painful, it is called hunger. It indicates not any local affection of the stomach which can be detected, but rather a general want of the system for nourishment. Nutrient introduced directly into the blood, or into the rectum, in the form of injection, removes A., and even hunger, without the stomach being directly affected. See FOOD, HUNGER, THIRST.

Appia'ni, Andrea, court painter to Napoleon, was born in 1754 at Milan, where are his most famous works, two frescoes, in the church of Sta Maria and the royal palace. He painted the portraits of the family of Buonaparte, and a number of classical and romantic pictures, among which are 'Olympus,' 'Toilet of Juno,' 'Venus and Cupid,' and 'Rinaldo in the gardens of Armida.' Honours were heaped on him prior to 1814; but his fortunes declined with his patron, and he died poor in 1818.

Appia'nus, author of a Roman history in Greek, was born at Alexandria, and lived at Rome during the reigns of Trajan, Hadrian, and Antoninus Pius. Eleven of the twenty-four books of his history are extant. His method of narration is peculiar, and not on the whole happy. Of the various peoples with whom the Romans warred from the beginning of their power till they had acquired universal dominion, he gives the history of each separately till its final conquest. Beginning with the old Italian tribes, he ends with the Illyrians and Arabians. His geographical blunders are very gross, but we have abundant evidence that he was in some cases singularly careful and exact in his weighing of evidence and authority. This holds good especially of the period of Augustus. Yet he is never brilliant or morally impassioned. Schweighauser's edition (3 vols. 8vo, Leipzig, 1785) is highly esteemed, but the most complete is that in the *Bibliothèque Grecque* of Firmin Didot, which contains the new fragments discovered by Angelo Mai. A. also wrote memoirs of his life, which have perished.

Appian Way (Lat. *Via Appia*), the oldest of the Roman roads, leading from the *Porta Capena* at Rome southward to Capua, and named after Appius Claudius Cæcus, who was censor in 313 B.C. It was afterwards extended to Brundisium. Remains of it may still be seen at Terracina. The engineering difficulties, which were great, were successfully overcome, but at an enormous cost. The roadway consisted of a foundation and several carefully-cemented strata, topped with a neatly-jointed pavement.

Appius Clau'dius Crassus, a Roman decemvir (451-449 B.C.) Remaining at Rome while his colleagues, with one exception, were abroad with the army on an expedition against the Sabines, he secretly ordered a beautiful maiden named Virginia, the daughter of Virginius, a plebeian who was with the army, to be seized, on the plea that she had been born the slave of his client M. Claudius, and then pronounced this plea valid in the court over which he himself presided. Virginius, informed of this by Icilius, the betrothed of Virginia, hastened to Rome to claim his daughter, but a second trial merely confirmed the issue of the first. Virginius, seizing a knife, slew his daughter to preserve her honour. Popular indignation was roused, and the army, returning to Rome, deposed the decemviri. A. C., according to Livy, committed suicide in prison, but Dionysius says the common opinion was that he was put to death in prison by order of the tribunes. This incident, graphically narrated by Livy, forms the subject of one of Macaulay's *Lays of Rome*.

Apple. The fruit known in Britain as A. is the produce of cultivated varieties of the common wild crab-tree, *Pyrus malus*. See PYRUS. The A.-tree is the most widely distributed of all fruit-trees, and succeeds best in temperate regions, although it also grows in the Indies, Persia, Arabia, and Australia. In tropical regions and in high latitudes, the fruit, however, is almost worthless. The varieties of A. are exceedingly numerous, and new ones are continually being produced by cultivators. Many marked varieties are known by general names, such as rennets, pippins, codlins, &c. All the different kinds are kept up and propagated, not by seeds, but by grafts and cuttings. The fruit is used for dessert, jelly, tarts, pies, sauces, &c. Its fermented juice forms Cider (q. v.). The cider A. takes the place of the vine in the N. W. of France. A. contains malic acid, which is used for medicinal purposes, and a vinegar and a spirit are made from them in Switzerland. Large quantities of apples are annually imported into Britain from the Continent and

America. The Greeks called the A. *Mela*, and the Romans *Malum*; the Hungarians call it *Alma*, the Bretons *Aval* or *Avallen*, the Welsh *Afelen*, the Germans *Apfel*, in Dutch *Appel*, in Danish *Æble*, and in Swedish *Äple*. Botanists term the fruit a *Pome* (q. v.). Biffins or Beauffins are apples which have been dried in ovens. There are different species of crab apples. The Siberian Crab A. is *Pyrus baccata*, the American Crab A. *P. coronaria*, and the Chinese Crab A. *P. spectabilis*. The name A. has also been given to other fruits, i.e., A. of Sodom to the fruit of *Solanum Sodomæum*; Adam's A., *Citrus Limetta*; Custard A., *Anona reticulata*; Devil's A., *Mandragora officinalis*; Egg A., *Solanum esculentum*; Love A., *Lycopersicum esculentum*; Mammee A., *Mammea Americana*; May A., *Podophyllum peltatum*; Pine A., *Ananassa sativa*; Rose A., *Eugenia lambos*; Thorn A., *Datura Stramonium*, &c. Oak A. is the name given to an excrescence formed on oak-trees by insects puncturing the branches.

Apple-Berry, an Australian name for *Billardiera* (q. v.)

Appleby, the county town of Westmoreland, on the river Eden, 30 miles S.E. of Carlisle, is a station on a branch of the Stockton Railway. It has an old castle which was defended during the civil wars by the Countess of Pembroke against the Parliamentary forces. The keep, 80 feet high, is called Caesar's Tower. A. has linen and woollen manufactories, and some brewing and malting. Pop. (1871) 1989.

Apple of Sodom. See SOLANUM.

Appleton, a town of Wisconsin, United States, on Fox river, near the Grand Chute rapids, with considerable trade in wheat, Indian corn, tobacco, and timber. Pop. (1870) 4518.

Appoggiatu'ra, a note in music printed always in small type, receiving the accent of, and taking half the duration from, the next following note. It is commonly a discord, and its notation probably arose from a wish to evade the strict laws of the old harmonists as to the preparation of discords. It was written as an ornament, with a tacit understanding that it was to be played in full. The purely ornamental note, printed in the same way, but played *without* accent, is called an *acciacatura*.

App at'ment, in English law, means the exercise of a power reserved under a deed of conveyance; such as a power to charge the property conveyed with a pecuniary burden. In Scotch law, the equivalent terms are 'reserved power,' and 'faculty to burden.' Courts of equity in England often give relief when the power of A. is defective in legal execution, if adequate, or what is called 'meritorious' consideration has been given for the reservation.

Appor'tionment, a legal term in the law of England and Scotland arising under the Appointment Act of 4 and 5 Will. IV. c. 22. The questions with which the Act deals were previously a common cause of litigation, arising mostly between the heir-at-law of one deceased and his executor; the heir being entitled to the real, the executor to the personal, estate; the difficulty being with regard to the portion of rents, interests, salaries, &c., which thus fall to each as determined by the date of death. The Act was for some time not held to apply to Scotland, but in 1844 the Court of Session decided that it did so, and this decision was affirmed by the House of Lords. The Act, being expressed exclusively in the phraseology of English law, has given much trouble to the Scotch courts. Its operation has been greatly extended by the Act 33 and 34 Vict. c. 35. The general principle of the accounting is that when any one dies, his income is counted up to the day of his death, and is payable at the same time as the next payment would have been had the recipient not died.

Apposi'tion (Lat. *appositio*, a placing near) denotes in grammar the placing of a noun, pronoun, adjective, or phrase beside another noun, to explain or limit it, as 'John the Baptist'; 'we thought her foolish'; 'you were silent when accused—a clear confession of guilt.'

Appraise'ment is the valuation made by the appraiser; but in English law it signifies the judicial valuation made under a 'distress' for rent. The corresponding term in Scotch law is *appriciation*, under a *Pwinding* (q. v.), an important process in the law of Scotland.

Appraiser is a person employed to value property. By 3 Vict. c. 15, duties on sales by auction were repealed, and a licence-duty of £10 a year imposed on the A. A few of the more important provisions of the Act are, unless an auctioneer disclose the name of his constituent, an action will lie against him in the event of breach of contract. Goods sold remain at the risk of the seller, so long as anything remains to be done by him to ascertain the price; afterwards, if allowed to remain on the premises of the auctioneer, it is at the risk of the buyer. If an estate advertised for sale by auction is sold by private contract, those who come to the expected sale may recover the expense of attendance from the seller, or from the A. if he will not name his principal; hence the common precaution in an advertisement 'unless previously sold by private contract.' A bidder may retract his offer previous to the fall of the hammer, unless there is an article of sale to the contrary. 'Puffing' may, in a court of equity, be held to vitiate a sale by auction.

Apprehend' is, in law, to arrest a criminal or debtor in order to commit him to prison. The warrant of a judge is usually required for the legal justification of apprehension; but certain officers may, under certain circumstances, A. summarily, without warrant. But the right must be exercised with great caution, any infringement of legal liberty forming a valid ground of action against the offender. A private person may find himself in considerable difficulty under the statutes regarding the law of apprehension; for not only is he entitled to arrest a felon if he observes the committal of the felony, but he is bound by law to do so, under penalty of fine and imprisonment, if he negligently allow him to escape. But again, a private person may not A. another merely because he suspects him of felony, however strong may be the suspicion. A peace-officer may A. any one against whom he can show reasonable ground of suspicion. The warrant of any judge in the United Kingdom for the apprehension of a criminal is effective throughout the United Kingdom, on the endorsement of a judge of the territory in which the warrant is to be enforced. Conventions have now been entered into between the British government and most foreign States for the extradition of criminals, except for political offences; and on the extradition of a criminal, it is always understood that he shall not be tried for a political offence. The wilful obstruction of a legal warrant to A. is a very grave offence, and if accompanied by certain aggravating circumstances, such as the use of firearms, is punishable with penal servitude for life. If the legal officer, or any one assisting him to discharge his duty, be killed in the endeavour, the crime is murder. See **DEFENDING FORCEBLY, DEFORCEMENT**.

Apprentice. An A. is one who engages by indenture to serve a master for a certain number of years, in order to be instructed in some profession, art, or manufacture, which the master becomes bound to teach him; or at least to afford him fair opportunity of learning. In Scotland, a pupil (see **AGE**) may enter into an indenture, yet he or she must have the concurrence of parent or tutor, who is alone responsible for the engagements of the A. At common law an A. cannot enlist or enter the Royal Navy; and by the Mutiny Act severe penalties are attached to his enlisting, besides which he is bound to serve as a soldier on the expiry of his apprenticeship; and if he does not deliver himself to a military officer authorised to receive recruits, he incurs the penalties of a deserter. In 1837 the House of Lords, on appeal, reversed a decision of the Court of Session in Scotland finding that an A. to a Dundee barber was bound to attend at his master's shop on Sunday mornings for the purpose of shaving customers. The decision of the Scotch court proceeded on the terms of the indenture, which provided that the A. should 'not absent himself from his master's business, holiday or weekday, late hours or early, without leave first asked and obtained.' The reversal again was on the ground of the stipulation being contrary to certain old Scotch statutes, especially one of 1559, which provides that 'na handy lauboring or winking be used on Sunday.' It is probable, however, that considerations of public expediency may have influenced the House of Lords in giving effect to the provisions of an ancient statute, which might otherwise have been set aside as obsolete. See **DESERTER**.

Appriming, an old Scotch law term now obsolete. See **ADJUDICATION**.

Approaches, in military language, are the trenches or protected roads by which the besiegers may advance with comparative safety, from one parallel of earthworks to the next, upon a besieged town or fortress.

Approbate and Reprobate. This is a technical expression in the law of Scotland, signifying that one takes advantage of one part of a deed, but rejects the rest. This the law does not permit. The analogous doctrine of the law of England is called *Election* (q. v.). The doctrine recommends itself to common sense; yet there are exceptions to its operation which probably do so also. The law will not allow any one to take benefit under the provision of a will, and at the same time to refuse to give effect to another of its provisions in favour of some one else; but to secure a benefit under a will, the law will not oblige the beneficiary to fulfil a frivolous condition, or a condition which in no way affects any private or public interest. Thus, a legacy devised under condition that the legatee change his name, will legally fall to the legatee without his being obliged to fulfil the condition; the law regarding the name by which a man chooses to call himself as a purely private affair. Apparent exceptions also occur. Thus, it has been decided by the Court of Session in Scotland, and affirmed by the House of Lords, that an heir-at-law may, in virtue of a deathbed deed, reduce a previous deed, otherwise good; at the same time, that he may set aside the deathbed deed, in so far as he is injured by it.

Appropriation Clauses. The effect of the Roman Catholic Emancipation Act (1829) was disappointing to those politicians who had hoped that one main effect of it would be the social and political pacification of Ireland. Of the causes of failure, the chief tangible one lay in the antipathy of the Roman Catholics to pay tithes to the Protestant clergy. So strong was this feeling, that any Protestant clergyman in the Catholic districts resorting to law to exact his rights, did so at the imminent risk of assassination. The remedies devised by the Liberal party in England were termed the A. C. They provided for the commutation of tithes into a rent-charge upon the land, for the reduction of the number of sinecures in the Irish Protestant Church, and for the appropriation of the surplus revenues to the advancement of the education of the people.

In 1833 the Liberal Cabinet succeeded in substantially carrying the second of these provisions. The Act by which this was effected is known as the Irish Church Temporalities Act. It still, however, left the Church of Ireland with an income wholly out of proportion to its adherents. The efforts of the Liberal party—somewhat, however, divided on the question—were renewed in 1834, but unsuccessfully. On 2d April 1835, however, the House of Commons, by a majority of thirty-three, passed a resolution affirming the principles of the third clause. The Conservatives resigned in consequence, and the Liberals returned to office, pledged to the appropriation principle. They twice succeeded in passing a bill affirming this principle through the House of Commons, but on both occasions the A. C. were rejected by the House of Lords. For some years the question maintained a precarious vitality at the hustings and in Parliament, but England and Scotland were plainly tired of it. The Government of 1838 carried a measure for Ireland, by which the tithes were commuted into a rent-charge of three-fourths of their value. They were now collected with comparative ease. The disendowment of the Irish Church in 1868 of course ended the controversy.

Approver, or **Prover**, in English law, is one who is necessary (see **ACCESSARY OR ACCESSORY**) to a crime, and bears evidence against his accomplice. There is an implied promise to the witness, or *Queen's evidence* as he is called, on condition of his making a full and true confession; but if he equivocate, he forfeits this claim, and his confession may be used against himself. The law of Scotland is very nearly the same as that of England respecting the A. or *Socius criminis*, as he is called in the criminal courts of Scotland. In Scotland, however, the *Queen's evidence* has better legal protection than in England. By the mere act of calling an accomplice as a witness, the public prosecutor gives up all right to proceed against him on account of the crime in question. Thus the objection to his testimony on the ground of its being his interest to criminate his associate is, or is supposed to be, obviated. But a private prosecutor cannot tie the hands of the public authorities by examining a *Socius criminis*. Sir Archibald Alison, in his *Practice of the Criminal*

Law of Scotland, mentions the case of a soldier, confined as a military delinquent, who was allowed to become A. against another charged with the same offence as himself. Counsel for the soldier objected to his client being made a witness, as he was amenable to trial by court-martial, and his testimony might be used against himself. The civil court, however, declared that they had power to protect him, and would do so if he were endangered by his evidence.

Approximation is a mathematical term applied to calculations which are not rigorously accurate, but are sufficiently near the truth for all practical purposes. As instances of A. may be mentioned logarithmic, trigonometric, and astronomical tables, and the solution of equations beyond the fourth degree.

Ap'pui, a French word meaning generally a stay or support. In military language a *point d'A.* is any part of a field of battle which can be used to assist the operations of an army, to facilitate assault or obstruct attack. Thus a wood, a morass, a river, or a slope may become a *point d'A.*

Appulei'us, or **Apuleius**, son of a wealthy magistrate of Madaura in Africa, was a famous satirist of the 2d c. After studying at Carthage and Athens, he entered on an extensive course of travel, during which he visited Italy and Asia. His first literary effort was his *Apologia*, still extant, spoken before the proconsul of Africa, in which he vindicated himself from the charge of using magic, preferred against him by the relatives of a lady whom he had married, and whose hopes of sharing in her wealth had been thus destroyed. It contains various biographical circumstances, and in particular an elaborate account of the circumstances that led to his marriage with Pudentilla at Oëa (mod. Trípoli?). His after-life was spent at Carthage, where he devoted himself to literature and oratory. He was a priest of Æsculapius, the patron god of the city; he had the charge of exhibiting gladiatorial shows and wild-beast hunts in the province; and statues were erected in his honour by the Senate of Carthage and of other states. According to Lactantius, the early pagan controversialists used to rank A. with Apollonius of Tyana as a miracle-worker equal to Christ. His reputation has been preserved by the *Golden Ass*, a work the motive of which is difficult to determine, but it can hardly be (as some have supposed) a satire on the quackeries of the pagan priesthood, for the hero (Lucius), after having gone through numerous ludicrous and painful adventures as a jackass, is at last restored to human shape by the interposition of the goddess Isis, to whose service he is solemnly consecrated for life. The *Golden Ass* abounds in wit and humour, and gives evidence of a wide erudition; but it is artificial, affected, and viciously archaic in diction, besides being unutterably gross in passages. Several other works of A. remain, though many are lost. G. F. Hildebrand published a complete edition at Leipzig in 1842. There are three separate English versions of the *Golden Ass*, one by T. Taylor (1822), another by Sir G. Head (1851), and a third in Bohn's Classical Library (1853).

Aprax'in, **Feodor Matvayevich**, a famous Russian admiral, born of noble family in 1671. He entered the navy in 1683, and in 1700 was made chief admiral. By greatly extending the marine forces he advanced the ambitious projects of Peter the Great, who favoured him with a warm friendship. He defeated Lübecker, the Swedish general (1708), in Ingermannland, and captured the Finnish town of Viborg in 1710. In 1713 he took Helsingfors and Borgo, defeated the Swedish fleet, and brought about the peace of Nystadt, by which Finland and Esthonia were finally ceded to Russia. He was present at the siege of Derbend (1722) during the Persian war; and died at Moscow, 10th November 1728.—His brother, **Peter Matvayevich A.**, rose to be lieutenant-general in the Russian army, and signalled himself by the suppression of a rebellion on the Lower Volga in 1703. He died at St Petersburg in 1720.—**Stepan Fedorovich A., Count**, a Russian field-marshal, grandson of Feodor, fought first against the Turks under Münich, and afterwards in the Seven Years' War against Prussia, in which he overran Courland (1757), entered Prussia, captured Memel, shattered the Prussian army under Lewwald, and was threatening Königsberg, when the news reached him that the Russian Empress Elizabeth was dying. Knowing the Prussian sympathies of her successor, he stopped in his career of victory. Unfortunately for him, Elizabeth recovered. A. was now re-

called, and imprisoned at Narva, where he died 31st August 1758. See *Biographien der Russ. Feldmarschälle* (Petersb. 1840-41).

Ap'rioot, the name given to fruit of the different varieties of *Prunus Armeniaca*, a tree, indigenous to Armenia, belonging to a sub-order of *Rosacea*. The name A., which was written *a-précote* by early authors on horticulture, is supposed to be a corruption of *Fraxocia*, the name given to it by the Romans. The tree is believed to have been introduced into Britain from Italy during 1524 by Woolf, gardener to Henry VIII. There are now numerous varieties in cultivation. The following are among the finest, viz., the royal, the Turkey, the large early, the Moorpark, and the Breda. Some of the kinds have sweet kernels, while in others they are bitter. The former are eaten as almonds, and from the latter, which contain prussic acid, is distilled the French *eau de noyaux*. The fruit is either eaten fresh, made into a preserve, or split up, the stone removed, and then dried. In Eastern countries it is used in cases of fever. A black pigment is obtained by charring the stones. *Prunus Brigiatiaca* is the Briançon A., and *P. Sibirica* the Siberian A.

Ap'ril (from Lat. *aperire*, to open), the name given in the Roman calendar to the month of the opening of the buds. The 1st of A. is called in England All-Fools' Day, from the custom of sending on that day simple persons on bootless errands. The person so imposed on is called in England an A. fool; in Scotland, a gowk, i.e., simpleton (also applied to the cuckoo); and in France, *un poisson d'Avril* (an A. fish). The origin of this custom is not certainly known. It may be a relic of paganism, or it may have been suggested by the sending of Christ backward and forward from Annas to Caiaphas, and from Pilate to Herod, as represented in one of the Easter miracle-plays. The Hindus practise the same sort of tricks on the 31st of March.

A-prio'ri is the name given to that process of reasoning which rests on what are held to be necessary or universal ideas, while reasoning *à-posteriori* is based on experience. Otherwise these two methods are styled the deductive and the inductive methods, Aristotle representing the former, and Bacon the latter. The advocates of each system assert that it virtually includes the other; the A. school holding that experience merely tests necessary truths; while the *à-posteriori* school maintains that these so-called 'necessary' notions are not simply verified by experience, but are derived from it.

Apsæ (Lat. *apsis*, an arch), the end of the choir or chancel of a church. It is sometimes semicircular, at other times it is polygonal, or even triangular. The word is applied also to the series of small lateral chapels which are usually arranged behind the altar in this recess. Crypts and vaults are generally placed under the A., to secure their being near the altar; and this gave rise to the structural necessity, which by-and-by became the traditional usage, of having the level of the A. above that of the floor of the church. When the ends of the transepts are finished with vaults, as they sometimes are, they are said to have apsidal ends. The origin of the A. in Christian churches was the vaulted extremity of the ancient basilicas. It is common as an architectural feature of the churches of Germany and France. In Italy it is seen chiefly in baptisteries; in England in chapter-houses. Specimens of it in Scotland are to be seen in the parish churches of Leuchars in Fife, and of Kirkliston and Dalmeny in Linlithgowshire.

Ap'sides, are the greatest and least distances of a heavenly body from its centre of attraction. In hyperbolic and parabolic orbits there is evidently but one apse. The line of A. (the line joining those points) is, as a necessary consequence of the law of gravitation, subject to a continual rotatory motion, which is well marked in the case of the moon.



Apsæ.

Apaley, a river of New South Wales, Australia, enters the Pacific 40 miles N.E. of Port Macquarie. A. is also the name of a strait, 48 miles long, and from $1\frac{1}{2}$ to 4 broad, between Bathurst and Melville Islands, to the N. of Australia.

Aptera ('wingless'), a name applied collectively to denote the three lower orders of insects—*Anophura* (lice); *Thysanura* (spring-tails); *Mallophaga* (bird-lice)—in which wings are undeveloped. The eyes are, further, of simple structure, or may be absent. The young undergo no metamorphosis, and these orders are hence also termed *Ametabola*.

Apteryx, a genus of Cursorial or Running birds, found in New Zealand, and including three species, the best known being the *A. Australis* of Gould.



Apteryx Australis.

It averages a goose in size. The webs of the feathers are of loose, unconnected structure, and no accessory plumes exist in the feathers. The beak is long, slender, and possesses the nostrils opening at its tip. The legs are short. Three front toes and a hinder toe exist, the latter being spur-like. The tail is rudimentary, as also are the wings, which are hidden by the feathers. Each wing terminates in a sharp claw.

This bird is of nocturnal habits, and feeds chiefly on insects.

Aptornis, the name of an extinct bird genus, the fossil remains of which occur in the Recent formations of New Zealand. These birds, like the apteryx, were wingless.

Apulia, anciently a maritime province in the S.E. of Italy, between the Apennines and the Adriatic, bounded on the N. by the Frentani, and on the S. by Calabria and Lucania. Its limits, as defined by Strabo, show that it included the area now forming the modern provinces of Capitanata (q. v.) and Terra di Bari (q. v.) The ancient inhabitants of A. were the Apuli, probably an offshoot of the Oscan race, and the Daunians, so called, according to Greek legend, from Daunus, the son of Lycæon, who settled on this coast; but whatever original difference may have existed between the two, at the dawn of Roman history they are completely blended into one people. Horace was a native of this region, and here, during the second Punic or Hannibalic war, the Romans suffered the tremendous disaster of Cannæ. The modern form of the name A. is Puglia.

Apure, a river of S. America, rising in the Eastern Andes of the United States of Colombia, and flowing westward through Venezuela till it joins the Orinoco (q. v.), after a course of 982 miles, 867 of which are navigable.

Apurimac, a river in Peru, rises to the N.W. of the tableland of Titiaca, and flows N. to join the Tangaragua and form the Amazon. It waters the richest part of Peru, and after 500 miles of its course takes the names of Tambo and Ucayali. From the great rapidity of its stream, the A. is useless for navigation, and its banks are almost inaccessible.

Aqua Fortis was the name given by the alchemists to dilute nitric acid on account of the corrosive action it exercises on many substances, and is still employed in the same sense. See **NITRIC ACID**.

Aqua Regia is a mixture of nitric and hydrochloric acids, usually in the proportion of 1 to 3, and is principally employed to dissolve the metals gold and platinum. The name A. R. was given to the above mixture by the alchemists, because it was the only substance then known which would attack gold—the king of metals.

Aquarium, an arrangement for keeping marine and freshwater creatures in captivity under conditions as nearly as possible the same as those in which they naturally exist. An A. is either one or a series of tanks or vessels containing fresh or sea water, according to the kind of creatures they are intended to receive. Aquaria are very useful for observation of the habits and life-history of creatures otherwise difficult to watch, and, on the small

scale, they form both a pleasing and instructive domestic ornament. The water in an A. must be kept in a condition fit to maintain the life of its inhabitants, not by frequent renewals, but by a sufficient access of atmospheric air, and by adjusting the balance of animal and vegetable life within it. The vegetation in a tank should be sufficient to absorb and decompose the carbonic acid evolved by the animals, and in fact an A. should be a perfect illustration of the reciprocal relations of animal and vegetable life. It should not be necessary to add anything to an A. in a healthy condition other than the food necessary for the creatures and sufficient water to replace that lost by evaporation. An A. tank should have a large superficial exposure, and the depth should be graduated by a sloping back of stonework. In the case of a domestic fresh-water tank it is sometimes possible to have a small jet continually playing in the centre, and where this is not practicable the water—both fresh and salt—must be frequently agitated to expose fresh surfaces to atmospheric influences. Where sea-water is not obtainable it may be artificially prepared by adding the necessary salts. It is seldom possible to keep seaweed alive in tanks, but under the influence of light sufficient minute vegetation develops from the spores disseminated through water, and in fresh-water as well as marine aquaria such vegetation is now preferred. Aquaria vary in size from small glass globes in which one or two gold-fish may be kept up to large buildings containing numerous tanks, many of them of several thousand gallons capacity. The first public A. was opened in the Zoological Society's Gardens, London, in 1853. Many Continental towns now contain aquaria on an extensive scale, and a large one was opened at the Crystal Palace, London, in 1871, besides another at Brighton a year later. In several other British towns public aquaria are either in contemplation or actual progress. The construction of aquaria proper may be said to date from 1841, when one was made by Mr N. B. Ward, the inventor of the Wardian case for plants. Since that time they have enjoyed great popular reputation, but success in managing the tanks of amateurs is frequently the result of much patient endeavour and many disastrous failures. Some creatures are easily kept alive in the confinement of aquaria, while others immediately succumb in spite of every care and attention.

Aquarius ('the Water-carrier'), one of the constellations of the zodiac, which the sun traverses during a part of January and February.

Aquatic Animals. Various species and groups of animal forms are adapted for life in the water. The fishes, crustaceans and many similar groups exemplify forms which are suited for a permanent aquatic life. Others, such as frogs, crocodiles, &c., are only partly aquatic in habits, and are said to be 'amphibious.' The swimming and wading birds also exemplify such forms; whilst the beavers, water-rats, otters, seals, &c., form examples of terrestrial types adapted for aquatic existence in a greater or less degree. The respiration or breathing of purely A. A. (e.g., fishes and crustaceans) is always carried on by *branchiæ* or gills—organs adapted for utilising the air, mechanically combined with or suspended in the water, for the purification or aeration of the blood. The air is not chemically combined, but merely mixed with the water; and if the water be deprived of this air, these A. A. perish for want of the vitalising atmosphere, just as land animals would do if the atmospheric air were abstracted. The land or terrestrial forms breathe by lungs, by the general surface of the body, or by air-tubes or pulmonary-sacs, as in insects or spiders. In these cases, the air is inhaled directly from the atmosphere. The plumage or fur of A. A. is usually protected by special secretions, as seen, for example, in the oily fluid furnished by the tail-gland of birds, &c. The whales—true mammals, breathing by lungs—seals, and other allied forms, require to ascend periodically to the surface of the water to inhale the atmospheric air. Some water insects and spiders (e.g., the water-spider *Argyroneta*) carry down bubbles of air with them for the purpose of breathing, and thus fill their abodes constructed at the bottom of pools.

Aquatic Plants. This appellation is sometimes used very vaguely, and made to embrace all plants found growing in salt and fresh water and in marshes. Botanists, however, apply it only to plants found in running or stagnant fresh water, such as the arrowhead (*Sagittaria*), water-lily (*Nymphaea*), pond-weed (*Potamogeton*), awlwort (*Subularia*), water-soldier (*Stratiotes*),

Jack-weed (*Lemna*), water-buttercup (*Ranunculus fluitans*), African pond-weed (*Aponogeton*, q. v.), *Vallisneria* (q. v.), *Anacharis* (q. v.), &c. Some A. P. root in the mud, and appear above the surface of the water, others remain submerged, while a few float freely on the surface without rooting below. A. P. possess a large number of Air-Cells (q. v.) in their structure.

Aquatint, a form of engraving by which imitations of China ink or sepia drawings are produced. It is accomplished by strewing powdered mastic over the surface of the copper-plate, which prevents the aquafortis from biting the points to which the particles adhere, and a mottled granular surface is the result.

Aqua Tofana. See TOFANA.

Aqua Vitæ, two Latin words signifying 'water of life', a phrase applied to alcoholic stimulants, inasmuch as they were considered capable of prolonging life, and as a cure for many diseases. Alcohol undoubtedly is a most valuable remedial agent in the hands of the skilled practitioner, and hence it was specially called A. V.

Aqueduct, an artificial watercourse. The fountains of Greece were so numerous and full-flowing that the Greeks stood in no need of aqueducts, though they were not unacquainted with them, but those of the Romans constituted some of their noblest structures, and two of them still contribute to supply Rome with water. Of the fourteen aqueducts of ancient Rome, only nine existed in the time of Frontinus, keeper of the aqueducts under Nerva and Trajan, and of these he wrote an account, which is still extant.



Aqueduct

1. *Aqua Appia*, begun by the censor Appius Claudius about 313 B. C. It was chiefly underground. All traces of it have disappeared.

2. *Aqua Velut*, commenced B. C. 273 by M. Curius Dentatus; chiefly subterranean; length 43 miles, traces of it at Tivoli and near the Porta Maggiore.

3. *Aqua Marcia*, built by Q. Marcius Rex, B. C. 144, about 60 miles long, its water was cold and wholesome, some arches are still to be seen in the Campagna.

4. *Aqua Tepula* (127 B. C.), afterwards connected with

5. *Aqua Julia*, built by Agrippa, B. C. 33, remains of it still exist.

6. *Aqua Vergo*, built by Agrippa to supply his baths; still in use, having been restored by the popes Nicholas V. and Pius IV. in 1568, now called *Aqua Vergine*, and furnishes the best water in Rome.

7. *Aqua Alsietina*, built by Augustus to supply his *Naumachia*, on which his mimic sea-fights were represented. It has been restored, and supplies the fountains in front of St Peter's.

8. *Aqua Claudia*, commenced by Caligula A. D. 36, and finished by Claudius A. D. 50. A series of splendid arches, still stretching across the Campagna, formed part of the *Aqua Claudia*.

9. *Aqua Novus*, the highest of all the aqueducts, with a length of 62 miles. The two last were united near the city, their channels running on the same arches. Their united streams doubled the former supply. The gate named *Porta Maggiore* is an interesting relic connected with these. By means of it they were carried over the *via Labicana* and the *via Praenestina*.

The aqueducts subsequently formed were inferior in extent and splendour to the older ones. The Romans generally built their aqueducts of brick. The conduit, which was paved, and had sides of brick or stone, covered over with an arch or a flat coping of stone, ran over semicircular arches, spanning from square piers.

Even the provincial towns of Italy in the Roman times had their water supply by means of aqueducts, as is witnessed by the A. of Trajan at Civita Vecchia, which had a course of 23 miles; and as late as 604 one of the Lombard 'dukes,' Theodolapius, built that of Spoleto. The modern aqueducts of Leghorn and Pisa are magnificent structures, the latter having a thousand arches. Wherever Rome formed settlements, this mode of procuring a supply of water was introduced; and in Spain, Portugal, and France extensive remains of such structures still exist. Those of the A. formed at Nismes, probably by Agrippa, now known as the Pont du Gard, are the most striking and the best preserved. Three rows of arches, rising the one above the other, support a small conduit, covered with slabs, the interior of which still retains its coat of cement. The height is 188 feet, and the length of the highest row of arches 873 feet. We have seen that Frontinus was 'keeper' or 'guardian' of the aqueducts under Nerva and Trajan. There was always such an officer, with the proper subordinates, to inspect, repair, and improve those useful structures. Special and separate functionaries were intrusted with the care of the channel, of the reservoir, of the cement, &c. That the Romans did not conduct water as we do in pipes, was not because they were ignorant of the law that water always finds its own level. This fact was well known to them. A magnificent recent construction of this kind is the Clifton A., 38 miles long, which supplies New York with the waters of the river Clifton. It was commenced in 1837, and finished in 1842. It crosses the river Haarlem by fifteen arches, the highest elevation of the masonry from the foundation being 150 feet. It can discharge 60,000,000 gallons of water in a day.

Aqueduct, a term used in anatomy to denote a narrow channel or conduit. There are the A. of Fallopius, the A. of the cochlea, and the A. of the vestibule in the petrous portion of the temporal bone, and the A. of Sylvius, communicating between the third and fourth ventricles of the brain.

Aqueous Humour, the watery or semi-fluid substance which fills and distends the *corneal chamber* of the eye or space between the posterior part of the *cornea* (the transparent front part of the fibrous capsule of the eye) and the front portion of the *crystalline lens*. The A. H. consists chiefly of water; $\frac{1}{10}$ of its weight being composed of chloride of sodium (salt) and extractive matters (Bacchius). It is probably formed by the epithelial cells of the posterior part of the cornea. See EYE.

Aqueous Rocks, otherwise called sedimentary or stratified rocks, are, as these names indicate, rocks which have been deposited in layers or strata through the agency of water, either in its liquid state, as in seas and rivers, or in its solid state, as in glaciers and icebergs. Such formations are continually going on, especially at the mouths of our great rivers and estuaries, the waters of which bring down from the interior large quantities of minutely divided sand and mud in suspension, which are gradually precipitated as the force of the current diminishes. A. R. are divided into a number of distinct strata, which serve as landmarks to the great periods of animal life upon the earth's surface. For further information the reader is referred to the three great primary divisions of A. R.—Kainozoic, Mesozoic, and Palæozoic.

Aquifolia'ceæ, a small natural order of evergreen trees and shrubs found in various parts of the world. Astringent, tonic, and emetic properties characterize the order. The common Holly (q. v.) (*Ilex Aquifolium*) is indigenous to Britain, and forms excellent hedges and fences. At Tynninghame, in Scotland, there are great hedges composed of it, which are about 150 years old. Its wood is white and hard, and is valued by the cabinetmaker; its bark furnishes birdlime; and its berries are emetic and purgative. *Ilex Paraguayensis* furnishes the *Yerba maté* or Paraguay tea of S. America. A decoction of the leaves of *Ilex vomitoria* is used by the Creek Indians as a mild emetic, under the name 'black drink.'

Aquila. See EAGLE.

Aquila, a fortified town of Italy, capital of a province of the same name on the Aterno, a branch of the Pescara, and in the neighbourhood of the highest peaks of the Apennines, is the seat of a bishop, and has a trade in paper, linen, wax, and saffron. It was built by the Emperor Frederick II., but was destroyed by an earthquake in 1703, when 2000 people perished. During

the Neapolitan rule the town was noted for its liberal sentiments. Pop. 12,000.

Aquila, Ponticus, the author of a Greek translation of the Old Testament, was born at Sinope, and flourished in the 2d c. A.D. Epiphanius states that he was a nephew of the Emperor Hadrian, but this is improbable. He was originally a pagan, then, according to some, a Christian, and finally a Jew. His version is remarkable for its *literalness*, and on that account was placed above the Septuagint both by the Jews (who called it *the Hebrew verity*) and the Ebionites (q. v.). Every Hebrew word is rendered by a corresponding Greek one. This feature renders it valuable for textual criticism, but much less so for interpretation.

Aquilaria/cese, a small order of Dicotyledonous trees, natives of the tropical regions of Asia. The fragrant wood of *Aquilaria ovata* and *A. Agallochum*, is called eagle-wood or Aloes-Wood (q. v.). It is regarded as the aloes or lign aloes of Scripture.

Aquilegia, a genus of plants in the order *Ranunculaceae*. See COLUMBINE.

Aquileja, or **Aglar**, the most westerly town of the Austrian Coastlands on the Adriatic Sea, 22 miles W.N.W. of Trieste. It was founded by Roman colonists in 181 B.C., soon became a rich centre of trade, and on account of its strong fortifications was called the second Rome (*Roma Secunda*). The great high-road of Italy to the East, the Via Emilia, was continued to A., and the roads to Rhætia, Pannonia, Noricum, and Dalmatia had their starting-point here. In 452 it was destroyed by Attila, and has never since risen to importance. Its line of bishops is carried back to the age of Nero, and can be traced with certainty to the 3d c. About the 6th c. they took the title of patriarchs, and claimed rank next to the Pope. In 1750 the patriarchate was divided into the two archbishoprics of Udine and Görz. As has a cathedral built in 1041, but is now a decayed place, without trade. Pop. 1750.

Aquinas, **St Thomas** (It. Tommaso d'Aquino), a famous schoolman of the middle ages, was born in 1225 at Rocca Secca, a small town near Aquino, in Naples. The family to which he belonged was one of the most illustrious in Southern Italy. His father, the Count of Aquino, was a nephew of the Emperor Frederick Barbarossa; his mother was descended from Tancred of Hauteville, the Norman conqueror of Sicily; his elder brothers, Reginaldo and Landolfo, held high offices in the Imperial army, while most of his sisters contracted distinguished alliances. A., however, was insensible to the associations of mere worldly greatness. From his youth he displayed an exclusive passion for philosophical and religious study. At the age of fifteen he entered as a novice the Dominican order. To escape the reproaches of his relatives he fled from Naples to Rome, and then proceeded on his way to Paris, but was arrested by his brothers at Siena, and confined in the paternal castle of Rocca Secca for a space of two years. According to the Bollandists (q. v.), who have invested this captivity with a halo of miraculous circumstances, when everything else failed, it was attempted to win A. back to the world by introducing a Lais into his chamber, but such was the violence of his virtue that she was forced to beat a precipitate retreat. It is said that the Dominicans obtained from the Pope and the emperor an order for his release, and for leave to follow the way of life he preferred. Be that as it may, in 1243 he took the Dominican vows, and went first to the schools of Paris, and afterwards to Cologne, where he had for his master Albertus Magnus (q. v.). At this period of his life he was very silent and meditative: his fellow-students called him *Bos magnus*, *bos mutus*, 'the great dumb ox'; but when he publicly sustained an argument with a singularly strict and luminous logic, Albertus, turning to the pupils, said, 'The bellowings of this ox will yet resound throughout the universe.' During 1245-48 he resided in Paris with his master, and on the return of Albertus to Cologne, A. accompanied him in the capacity of *magister scholarum*. It was about this time that he composed his first works, *De Principiis Naturæ* and *De Ente et Essentia*. In 1252 he again went to Paris, obtained a chair of theology, preached in the churches, and commenced the writing of his *Opuscula*. Meanwhile a lively quarrel broke out between the University of Paris and the mendicant orders, which was ultimately fought out before Pope Alexander IV.; Albertus

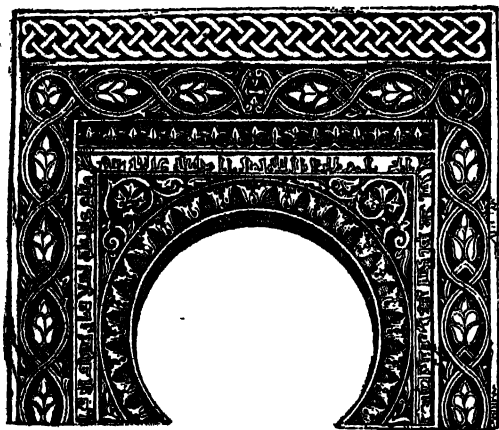
Magnus, Bonaventura, and A. were the victorious champions of the latter. Their arguments can still be read in one of A.'s *Opuscula* entitled *Contra Impugnantes Dei Cultum et Religionem*. In 1257 he obtained from the same university, against whose leaders his polemic was delivered, the degree of doctor, and his reputation as a philosopher and divine now spread over the whole of Latin Christendom. His school in Paris was crowded with disciples; princes sought his advice, and Louis IX. made him a member of his Privy Council. Pope Urban IV., anxious to bring about a reconciliation between the Greek and Roman Churches, called him to Italy in 1261, and A. accompanied his Holiness on all his journeys, teaching and lecturing in many cities of the peninsula. To this period belongs his *Contra Errores Græcorum*. Clement IV., who became Pope in 1265, entertained the same high respect for A. as his predecessor, and offered him the archbishopric of Naples, which he declined. A.'s real ambition was to govern the thoughts of men, not to rule the Church. It was from this desire that he undertook the great work of his life, the *Summa Theologie*. 'Disgusted,' as he tells us himself, 'with the extravagances, obscurity, and disorder of the scholastic theology up to his own time, he conceived the idea of a luminous and methodical compend of the entire system of Christianity, from the sublime doctrine of the existence of God down to the humblest precept of evangelical morality.' The execution of this *chef-d'œuvre*, the supreme monument of the 13th c., occupied the last nine years of his life, without, however, hindering him from discharging his public duties as a lecturer on divinity in Bologna, Paris, and Naples. Summoned from the last of these cities by Pope Gregory X. to take part in a council at Lyon, he was seized with illness on his journey, and expired at Fossa-Nuova, in the diocese of Terracina, 2d March 1274, at the early age of forty-nine. His canonisation was declared by Pope John XXII. in 1323, and the title of *Doctor Ecclesiæ* was conferred on him by Pius V. in 1567. His world-famous surname *Doctor Angelicus* was given to him because of the precision and completeness with which in the first part of his *Summa* he defines the nature and attributes of angels. If any one wishes to thoroughly comprehend the peculiar character of metaphysical thought in the middle ages, he should study A., in whose writings it is seen in its greatest consistency. Depth and strength of understanding, vigour of logical statement, fulness of knowledge,—these are the great qualities of the *Summa*. Nor is there absent from it, though more fully seen in some of his other works, such as the *Summa Catholica Fidei contra Gentiles*, a flame of devotional poesy, and that strange mysticism into which all spiritual thought seems ever destined to pass. The literature to which A. has given birth would itself make a library, and is a testimony to the immense influence of the man. His own writings, which are far too numerous to specify, have been printed separately and collectively many times. Among the complete editions may be mentioned those of Rome (18 vols. fol. 1570-71); Venice (18 vols. fol. 1593-94); Antwerp (19 vols. fol. 1614); Paris (23 vols. fol. 1636-41); Venice (20 vols. fol. 1745-60). A new edition, to be completed in 24 vols., was begun at Rome in 1858. See Haureau, *De la Philosophie Scholastique* (2 vols., Paris, 1850).

Aquita'nia, the name given by Cæsar to that part of Gaul which lay between the Garonne and the Pyrenees, and which was originally peopled by an Iberian race akin to the Basques of Spain, whose name is still preserved in the words 'Vascons' or 'Gascons' and 'Biscay.' See BASQUES. Augustus added the country between the Garonne and the Loire, which was inhabited by fourteen tribes. In the year 412 it was conquered by the Arian Visigoths, from whom it was wrested in 508 by the 'Catholic' Clovis, but under the later Merovingian kings it became an independent duchy. After various fortunes, it was united to France in 1137 by the marriage of the heiress Eleanor to Louis VII. Fifteen years later, by the marriage of the divorced Eleanor with Henry II., it became English, but it was finally united to France in 1451.

Ara, a genus of Scansorial or Climbing birds, popularly known as Macaws (q. v.). The name *Macrocerus* is more frequently applied to indicate this genus; and the name A. is derived from the Indian name for these birds, which inhabit tropical America and the W. Indies.

Arabesque (Fr.), a term meaning in the Arabian style, but

generally applied to a fanciful style of ornament, much used in mural decoration among the ancients, and subsequently in



Arabesque.

general use for various purposes, and the purest types of which are afforded by the Venetian monuments of the Lombardi and other *cinquecento* sculptors. It consists of floriated scrolls and figures perfectly executed. *Grotesquerie*, however, has formed—though not in all cases—a quality of A. from the earliest times, and foliage with griffins appears in the friezes of Greek temples, and in the mural decorations of Pompeii. Saracenic A. is seen in wonderful variety and beauty in the Alhambra; but the most splendid examples of this species of ornamental design are the works of Raphael and Giulio Romano. See Wornum's *Analysis of Ornament* (1861).

Arabgir (anc. *Anabrace*), a town in the vilayet of Sivas, Asiatic Turkey, on the caravan route between Aleppo and Trebizond, distant from the latter S.S.W. 150 miles. It lies on an elevated plateau, is surrounded by mulberry-trees, and employs an immense number of hand-loomers in the weaving of cloths from English cotton yarn. Near A. are the lead and copper mines of Kaben-Maden. Pop. about 30,000, chiefly Turks and Armenians.

Arabia, the great peninsula of south-western Asia, connected with Africa by the Isthmus of Suez, and with the Asiatic continent by the Syrian Desert, is bounded W. by the Indian Ocean, S. by the Red Sea, and E. by the Persian Gulf. Lat. 12° 30' to 31° N.; long. 32° 20' to 60° E. Area estimated at 1,230,000 sq. miles; pop. at 4,000,000. The general type of A., according to Palgrave, the most recent explorer of A., who has crossed the peninsula from the frontier of Palestine to Muscat on the Sea of Oman, is that of a central tableland, surrounded by a desert ring, sandy to the S., W., and E., and stony to the N. This outlying circle is in its turn girt by a line of mountains, low and sterile for the most part, but attaining in Yemen (q. v.) and Oman (q. v.) a height of from 6000 to 8000 feet in many of the peaks, and also considerable breadth and fertility, while beyond these a narrow rim of coast is bordered by the sea. The surface of the midmost tableland or Nejed (q. v.) equals somewhat less than one-half of the entire peninsula, and its special demarcations are much affected, nay, often absolutely fixed, by the windings and in-runings of the 'Nefood,' or sand-passes—offshoots from the D'hana, or Great Sandy Desert, in the S. of the peninsula, and which covers about one-third of its entire extent. If to these central highlands we add whatever spots of fertility belong to the outer circles, it will be found that A. contains about two-thirds of cultivatable or at least of available land, with a remaining third of irreclaimable desert, chiefly to the S. The whole of the W. maritime region of A., extending S. from the Syrian frontier to the neighbourhood of Aden, stretching inland in some quarters to the depth of 200 miles, and embracing the provinces of Hedjas, 'Aseer, and Yemen, belongs to the Ottoman empire; the north-eastern region around the lofty Djebel Shomer is under the dominion of the Sultan of Shomer; Nejed, the central highlands, extending N.E. from Mecca to the N.W. shores of the Persian Gulf, and having an average breadth of about 350 miles, forms the empire of the

Sultan of Wahhabi; while the maritime region of the S.E., from the peninsula of Katar to Dojar on the Indian Ocean, is under the supremacy of the Sultan of Oman or Muscat. Hadramaut (q. v.), the strip of coast region extending along the Indian Ocean from Aden to Dojar, is occupied by independent tribes. The principal towns are Mecca and Medina in the province of Hedjas; Sana and Mocha, in Yemen; Aden, on the S. coast, near the entrance to the Red Sea, and belonging to England; Muscat, in the S.E., on the Gulf of Oman; and Ri'ad, the capital of the Wahhabis, in the central highlands.

Climate, Soil, &c.—In the low lands and upon the strips of desert the heat is intense, and the blast of the Semmum, or 'poisonous wind,' is described by Palgrave as fatal when encountered on the open plains. In the central highlands the climate is delightful, and here corn, vegetables, and most of the sub-tropical products are grown with success. In A. the best coffee and dates are produced and exported, besides gums, myrrh, and various spices, senna and other drugs, and pearls from the Persian Gulf. Cotton, indigo, and tobacco are also cultivated, and might be largely grown for export. The principal domestic animals of A. are the camel, the celebrated breed of horses, oxen, sheep, and goats. Among wild animals are the lion, panther, jackal, and hyena.

History.—The earliest inhabitants of A. are believed to have been Cushites, who were forced to migrate from A. to Abyssinia on the arrival in their country of certain Semitic tribes descended from Kahtan, the grandson of Shem, and Ishmael. The *Ilimyarides*, a dynasty descended from Kahtan, are said to have flourished in Yemen for 2000 years. The Romans, who invaded A. in the beginning of the 2d c., and again under Augustus, failed to reduce this dynasty to dependence. But what the Roman legions could not accomplish was brought about by subsequent internal disturbances, and for several centuries the history of the country is only a record of inter-tribal wars. With the rise of Mohammed A. also arose; and the tribes, having adopted the creed of the Prophet, united for the sacred purpose of extending it; and under the Califs (q. v.)—the successors of Mohammed—A. attained great power, and spread her conquest far and wide. In 749 the Abbasides (q. v.) assumed the rule of the Faithful, and the reigns of Mansur, Harun-al-Raschid, and *al-Mu'tasim*, the most splendid of the Bagdad Califs for luxury and refinement, form the golden age of the Mohammedan dynasty. In the 9th c. the merchants of A. were in all the markets of the world, trading from Spain to India and China. The removal, however, of the capital of the Califs far beyond her frontier was the first cause of the decline of A., and after the capture of Bagdad (1258) and the fall of the Abbasides, the country relapsed into insignificance. In recent centuries the territory of A. has been ravaged by various assailants, and during the 16th c. the Turks had acquired Yemen, the Persians Oman, and the Portuguese Muscat. The *Wahhabis* (q. v.) arose in A. towards the close of the 18th c., and established themselves supreme in Nejed. Their enjoyment of power, however, was not without a check. Ibrahim Pasha (1818) swept down upon them, and set up Egyptian domination in their province. But the misrule of the Egyptian princes led to their own overthrow, and Turke, a surviving son of the last Wahhab monarch, was installed in the throne of his fathers. Feizul, the son of Turke, has extended the Wahhabite religion and sway, and seems to have inaugurated a more promising era among its inhabitants, as a wider area of soil is now under cultivation in Nejed and its dependencies. See Palgrave's *Central and Eastern Arabia* (Macmillan, 1865); Burton's *El-Medina and Meccah* (Longmans, 1855); and Wrede's *Reisen in Hadramaut* (1870).

Arabian Language and Literature. The Arabic is the most widely-spread branch of that family of languages commonly called the Semitic, though a more appropriate designation would be the Syro-Arabian. Together with the Ethiopic it forms the southern branch of the family, and is divided into a northern and southern dialect, the former of which has become predominant through the influence of the Koran. Arabic is not only a language highly-developed, but from the peninsular position of Arabia it has preserved nearly perfect purity of form and idiom. Being necessarily coextensive with the spread of Islamism, it was spoken and written in almost all Western Asia, in Eastern and Northern Africa, in Spain, and in some of the Mediterranean islands. It was the ecclesiastical language of Persia, Turkey, and the other Mohammedan countries, in each of which it has

left traces of its former ascendancy; and it is still as indispensable a part of a learned education to a Moslem priest as Latin is to a Christian ecclesiastic. It has a close affinity with Hebrew, and contains nearly nine-tenths of the Hebrew roots; hence it has now begun to be studied by those who wish to accomplish themselves as Biblical scholars. The grammar and lexicography have been so elaborately explained by native scholars, that the student of Arabic can proceed with as much confidence as the student of Greek. Abul-Aswad-al-Dulī, who flourished under Alī, the fourth calif, was the earliest grammarian; Mohammed-ben-Yakub-al-Firuzabadi (died 1414) compiled *Al-Kamus*, the best lexicon of the language; and technical terms in art and science have been explained by Jordsahani. Arabic, which is singularly rich in synonyms, is spoken with the greatest purity in Yemen. The old Kufic form of writing, which had special symbols for only sixteen of the twenty-eight consonants, was displaced in the 10th c. by a current handwriting, the *Naskhi*, still in use, in which points distinguish the consonants that are similar in form. Arabic texts are either pointed or unpointed, the points representing the vocalisation. There are collections of Arabian MSS. in the Escorial, and at Rome, Paris, Berlin, Vienna, Gotha, Leyden, London, and Oxford. Among the more recent contributions to Arabic grammar and lexicography are *Grammatik der Neu-Arabischen Sprache*, by Wahrmund (4 vols. 1861-66); and an *English Lexicon of Modern Arabic*, by Newman (2 vols. 1871).

The earliest Arabian literature is poetic, as was to be expected from the temperament, the mode of life, and the surroundings of the nomadic tribes. Love and war are the themes, and poetic contests, like those at the Grecian games, were held at the great fair of Mecca and elsewhere. The successful poems, rewritten in characters of gold, were hung up in the Kaaba at Mecca, and thence termed the *Motsahhabat*, 'the Golden,' or *Moallakat*, 'the Suspended.' The *Chrestomathie Arabe* of De Sacy (2d ed. Paris, 1822) contains translations from Nabegha, Asha, and Shanfara, the most distinguished of the bards before Mohammed. Kaab-ben-Zohair also deserves mention. He lived to celebrate the work of the Prophet in verse, which Freytag published with a Latin translation (Bonn, 1822). The peculiar nature of the life and poesy of an Arab minstrel of this period are beautifully delineated in the *Divan* of Amrulkais (translated into German by Rückert, Stuttg. 1843). The richest collection of the older Arabian poesy is to be found in the *Anthologies* of Hamāsa, the *Divan* of the Hudhailites (published by Kosegarten, Greifswald, 1854), and the *Kutāb al-aghāni* (Kosegarten, Greifswald, 1840). See Weil, *Die Poetische Literatur der Araber vor Mohammed* (Stuttg. 1837).

The revision and publication of the Koran by Calif Othman, in the middle of the 7th c., marks an important era in Arabian culture; and fully a century later, after a whirlwind of conquest, the Arabs settled themselves down to literature, science, and the arts, under the fostering sway first of Al-Mansūr (754-75), and afterwards of the world-renowned Harūn-al-Raschid (786-808). Men of learning were attracted from all quarters, and splendidly rewarded; translations of the best Greek, Syriac, and Persian authors were made and disseminated; schools were founded in the more important cities; libraries were collected; and pupils repaired from many parts of Europe to Cordova, in Spain, where also the Arabs had founded a famous school. Such rapid progress in culture is without a parallel; indeed, Arabian literature spans the chasm between the extinction of classical learning and the revival of letters in the 15th c., and what is justly known as the 'dark ages' in the rest of Europe, was a period of intellectual light and splendour in Arabian Spain. All departments of learning were cultivated. Medicine, physics, and mathematics received special attention, and astronomy, geography, and history were favourite studies. The earliest Mohammedan historian is Hesham-Mohammed-al-Kelbi (died 819), who wrote a life of the Prophet (ed. by Wüstenfeld, Gött. 1857). In the same century flourished Wakedi (died 822), Ibn-Kotaiba, Abu-Obaida, Al-Baladsoori, and Afraki. But with the 10th c. history became a sort of passion with Arabian authors. Masudi wrote an historical encyclopædia entitled *Meadows of Gold* (Fr. transl., vol. I. Paris, 1861); Tabari (died 922) wrote *Annals* (Kosegarten, Greifswald, 1831), and Hamza of Ispahan, and Eutychius of Alexandria first attempted universal history; Abulfaraj and Abulfeda followed; Abul-Kasem of Cordova (died 1139) narrated the history of the Arabic dominion in Spain, Navairi the

history of Sicily under the Arabs, and Ibn-Abizer the annals of the Moorish kings. The style of the Arabian historians is simple and unadorned.

The Koran is the basis of Arabian theology and jurisprudence; but the study of the Aristotelian philosophy resulted in speculations which gave rise to numerous sects, four only of which are regarded as orthodox. The sayings of Mohammed have been collected into what is known as the *Sunna*, a valuable body of tradition, which helps to the elucidation of the Koran, the principal occupation of students in theological jurisprudence. The attention of the French has of late been directed to Mohammedan law, a course rendered indispensable by their conquest of Algeria. In philosophy, the Arabians confined themselves mainly to the exposition of Aristotle; and Western Europe owed its acquaintance with the Peripatetic philosophy to translations into Latin from the Arabic. Among their most eminent and best known philosophical writers are Avicenna (11th c.), Abubeker Ibn-Tofail, who seems to have anticipated the evolution theory in his *Hai-elm-Yokdan* (Pococke, Oxf. 1671); and Averrhoes (12th c.), famed as much for his medical system as for his commentaries on Aristotle. See Ritter's *Ueber unsere Kenntnisse der Arab. Philosophie* (Gött. 1844), Dieterici's *Naturanschauung und Natur Philosophie der Araber im 10. Jahrh.* (Berl. 1861). That medicine owes so much to the Arabs results primarily from their intimate acquaintance with the uses and properties of simples, due to the exuberant vegetation of South-Western Arabia. Alchemy (q. v.), first cultivated in Egypt, was taken up by the Arabians, and by them introduced into Spain; and hence arose chemical pharmacy, a purely Arabic creation. In all departments of medical science they were brilliant discoverers, except in anatomy, dissection being forbidden by the Koran. The Arabic notation, and the substitution of the sine for the chord in trigonometry, were valuable contributions to mathematical science; astronomy and geometry were sedulously cultivated; Euclid was translated into Arabic, and several important astronomical discoveries were made. The Christian and Jewish elements are necessarily meagre, as neither Judaism nor Christianity obtained any permanent influence among the Arabs as a nation. Hence no entire version of the Bible exists in Arabic, though independent versions of separate books are far from scarce. These versions, however, were not made directly from the Hebrew, but from the Septuagint, or from Latin versions.

But by far the brightest outcome of their literature was their poetry, which gradually assumed a highly artistic form. Fiction, expressed both in verse and prose, was wonderfully popular; and *The Arabian Nights' Entertainments* (q. v.) still ranks as perhaps the most graceful and interesting collection of fabulous and romantic lore in existence. Hardly less popular is the poem on the exploits of Antar (q. v.). The drama alone, of all species of poetic composition, was neglected; but their imaginative literature still colours that of Europe. We have only space for the names of some of their more brilliant bards; as Motenebbi, Abul-Ala, Omar Ben-Faredh (*Divan*, Paris, 1855), Abu Nuwas, Tograi Ibn-Doreid, Busiri, Hamadani, and Hariri. This wonderful luxuriance has been succeeded by a barrenness as wonderful, due to the depressing sway of the Turks, though the press of Cairo, Beyrout, and Algiers occasionally issues works of no great importance, written evidently with an eye to European criticism. Hammer has written a history of Arabian literature in 7 vols. (Vien. 1850-56); it is exhaustive so far as it goes, but it only comes down to 1258. A very complete survey of the subject is given by Zenker in his *Bibliotheca Orientalis* (2 vols. Leipz. 1846-61).

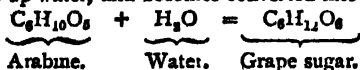
Arabian Nights' Entertainments, the title usually given to English reproductions of *Les Mille et une Nuits*, *Contes Arabes traduits en Français* (The Thousand and One Nights—Arabian Tales, translated into French), by Antoine Galland, a famous Orientalist, and which were first published in Paris in 12 vols. 1704-14. Galland described the collection as that of an unknown Arabian author; but at first he himself was believed to be the writer. All doubt on this question has long been dispelled: a number of MS. copies of the text in Arabic have been found at Cairo and published. Among these is the *Alif Laila*, or *Book of the Thousand Nights and One Night*, commonly known as the *A. N. E.*, now for the first time published complete in the original Arabic, from an Egyptian MS. brought to India by the late Major Turner Macan (editor

of the *Shah Namah*), edited by W. H. Macnaughten, Esq., 4 vols. Calcutta and London, 1839. The *Thousand and One Nights* had its origin in a collection of Persian tales called the *Thousand Fanciful Tales*, which are known to have been in existence in the middle of the 10th c. But though the *A. N. E.* contains much matter similar to what occurs in its archetype, yet it has this claim to be an original work, that it was written most probably in Egypt during the 16th c. by an Arab, and that its tales are exclusively illustrative of Arab character, whether the scene in which they are cast be Persia, India, or China. 'In my endeavours,' says Mr Edward William Lane (q. v.), the most scholarly and most successful translator of the *A. N. E.*, 'to ascertain the period and the country in which this work was composed, I have not merely considered its internal evidences of the time and place. The earliest period at which any portion of it has been incontestably proved to have existed is the year 955 of the Flight (A.D. 1548).' The exquisite fancy, humour, and pathos of these tales, and the evident fidelity of its pictures of Arab town life and manners, have won for it an extraordinary popularity in England and on the Continent, and evoked the indirect flattery of scores of imitations. Perhaps the latest and most perfect edition of the *A. N. E.* is the new edition of E. W. Lane's translation, edited by E. Stanley Poole (Murray, Lond. 1859). In this work, which is *de luxe* in illustrations, &c., the interesting question of the origin and literary history of this singular collection of tales is fully and satisfactorily discussed. Among the other translators of the *A. N. E.* may be mentioned Dr Scott (1811); Henry Torrens, who translated the *Alif Laula* (Calc. 1838); and the Rev. Ed. Forster (Lond. 1847).

Arabian Numerals, the name given to the characters 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. They were in reality borrowed by the Arabs from the Hindus, and were first introduced into Europe about 980 A.D., but were not in general use until the invention of printing.

Arabian Sea (anc. *Mare Erythraum*), an immense bay of the Indian Ocean, stretching from India to Arabia, and extending from Beloochistan on the N., to about the latitude of Cape Comorin and Cape Guardafui in the S. It includes the Persian Gulf and the Red Sea proper, the latter of which was connected with the Mediterranean Sea in 1869 by the Suez Canal (q. v.). From the earliest times till the doubling of the Cape of Good Hope in 1497, the A. S., together with its great inlet, the Red Sea, was the chief route by which trade between Europe and the East was carried on.

Arabine is the chief constituent of *gum-arabic*, in which it occurs combined with lime and potash. By adding alcohol to an aqueous solution of gum arabic acidulated with hydrochloric acid, pure A. is precipitated in white flocks. Its composition is the same as that of starch, both of which contain quantities of carbon, hydrogen, and oxygen, corresponding with the formula $C_6H_{10}O_5$. When boiled with dilute sulphuric acid, A., like starch, takes up water, and becomes converted into grape sugar.



Aracaju, the capital of the Brazilian province of Sergipe, on the river Cotiguba about 5 miles from its mouth, and 150 miles N. of Bahia. It is the only port of the province opened to foreign commerce, and has considerable trade, chiefly in cotton and sugar, the latter of which is of superior quality. In 1872 the value of sugar exported was £369,938, and of cotton, £306,532. A bar at the mouth of the river, however, is a great hindrance to shipping, and has caused the transmission of two-thirds of the trade of Sergipe to the port of Bahia. Pop. over 20,000.

Aracan, or **Arakan**, the most northerly province of British Burmah. Area, 18,530 sq. miles; pop. (1872) 484,363. It is separated from Pegu and native Burmah by the Yomah Mountains, from 3000 to 5000 feet high, and its seaboard extends from the estuary of the Naaf to Cape Negrais, along the E. side of the Bay of Bengal. Akyab (q. v.) is the chief town. The principal export is rice. A. (properly Kakhang-pyce-gyce) was once an independent kingdom, but was conquered by the Burmese in 1783. Its old capital, now known as Mro houn, lies in a basin 50 miles inland, and is now a place with 4000 inhabitants. Some

parts of its former fortifications are still to be seen, and the numerous ruined pagodas and palaces buried in the jungle attest its ancient grandeur. The famous idol which stands near the capital of Burmah was taken from A., and is still tended by the descendants of Aracanese captives. The province was annexed by the British in 1826, and is now divided into four districts—A. Hill Tracts, Akyab, Kyauk-hpyoo (formerly Ramree), and Sandoway.

Aracari, or **Aricari**, a sub-genus of the Toucans, included under the name *Pteroglossus*. These birds are coloured green, with red or yellow breasts. They inhabit S. America, and possess much smaller bills than the toucans.

Araceæ, an order of Monocotyledonous plants. See **ARUM**.

Arachis, a genus of Leguminous plants with papilionaceous flowers. *A. hypogæa* has the remarkable habit of pushing its fruit or pods into earth, where they are matured; hence they receive the name of *ground nuts* in this country. The plant is an annual, and was originally a native of the W. Indies and Africa, but is now cultivated in most warm regions, and even succeeds well in France. The pods contain two seeds about the size of a pea, which are eaten as food, either raw, boiled, or roasted. When pressed, a large quantity of oil is obtained from them, one bushel yielding about one gallon. The oil is equal in quality to olive oil, and is often used as a substitute for it. It has been used in the manufacture of soap, &c. The plant is recommended as forage for cattle.

Arach'nida, a class of *Arthropoda* or Higher Annulose animals represented by spiders, mites, scorpions, &c. The A. are distinguished by the head and chest being united to form a single segment—the *cephalothorax*; by the presence of eight legs; by the absence of wings and antennæ, and by the breathing organs consisting of pulmonary-sacs, or of tracheæ, or of both combined. The eyes are simple. The class is divided into the section *Trachearia*, represented by mites, ticks (*Acarina*), sea-spiders (*Podosomata*), and harvest-spiders (*Phalangida*), &c. These breathe by air-tubes or tracheæ, and the eyes are not more than four in number. The second section, or *Pulmonarians*, represented by spiders and scorpions, breathe by pulmonary-sacs alone, or combined with tracheæ, and the eyes number six or more.

Arach'noid Membrane. The brain and spinal cord are protected by three membranes. These are (1) the *dura-mater*, a fibrous structure which lines the skull and canal of the vertebral column; (2) the *pia-mater*, a very thin fibro-vascular membrane spread over the surface of the brain and cord; and (3) the *arachnoid*, a serous sac placed between the *dura-mater* and *pia-mater*, covering the inner surface of the *dura-mater* on the one side, and the outer surface of the *pia-mater* on the other. The *arachnoid* is thus a shut sac containing a small quantity of serous fluid. Between the A. M. and the parts where the *pia-mater* dips into the fissures of the brain is a space called the sub-*arachnoid* space, which also contains a serous fluid called the cerebro-spinal fluid.

Arad, the capital of a province of the same name, Upper Hungary, on the Marosh, a branch of the Theiss. It was destroyed by the Turks in the 17th c.; but when rebuilt it was strongly fortified, and afterwards played an important part in the revolution of 1849. Kossuth issued from A. his proclamation declaring the hopelessness of the Hungarian cause. A. is the seat of a non-united Greek bishop, and has a gymnasium and a Walachian seminary. Next to Pesth and Debrecz it has the largest cattle-market in Hungary. There is also a large trade in corn and tobacco. Pop. (1869) 32,725. On the opposite bank of the river lies New A., a fortified suburb with 4670 inhabitants. The province is rich in wine and wood, and contains marble quarries and mines of copper and iron. Area, 1700 sq. miles; pop. 254,000.

Ar'afat, **Mount** (*Jebel-ar-'rahme*, Mountain of Mercy), a small hill 15 miles S.E. of Mecca, on which, according to Mohammedan belief, Adam again met Eve, after a separation of 200 years, following the banishment from Paradise. See **ADAM**. It is the scene of a great yearly ceremony at which the Mohammedan pilgrims require to be present before they can assume the name of Hadji. Burckhardt states that in 1814 the gathering consisted of upwards of 70,000 people.

Arage, Dominique François, a famous French physicist, was born at Estagel, near Perpignan, in the department of the Eastern Pyrenees, February 26, 1786. At the age of seventeen he entered the Polytechnic School at Paris; and in 1805 became secretary to the Paris Observatory, in which capacity, along with Biot and the two Spanish commissioners Chaix and Rodriguez, he extended from Barcelona to Formentera the measurement of the arc of the meridian which had been begun by Delambre and Méchain. A succession of romantic and perilous incidents now befell him. Suspected of being a spy, he was for a time a prisoner in the citadel of Belver, near Palma, twice carried to Algiers, and once sent to the Spanish hulks at Palamos. Finally, in 1809, he reached Marseille. A few months after his return to Paris he was almost unanimously elected to fill up the vacancy in the Academy of Sciences occasioned by the death of Lalande, and about the same time was appointed a mathematical professor at the Polytechnic School, where he had Laplace and Monge for his colleagues. From this date till 1848 he was engaged almost wholly in scientific pursuits. In 1811 he directed his attention to the polarisation of light, and laid the foundation of that branch of physical optics known as chromatic polarisation. In 1816 he started, along with Gay-Lussac, the *Annales de Chimie et de Physique*; and, in the same year, demonstrated the truth of the undulatory theory of light over the emission theory. In 1820 he followed up with great success Oersted's discovery of the action of an electric current upon a magnet; and for his labours in this field he received, in 1825, the Copley Medal of the Royal Society of London. As regards politics, A. was a keen republican. He had a seat in the provisional government of 1848, and was made Minister of War, and later was a member of the War Committee in the National Assembly. He showed his consistency in refusing to take the oath of allegiance to Napoleon III. after the *coup d'état* of 1852; but the emperor made special exception for him in recognition of the valuable services, scientific and political, which he rendered his country. A. died at Paris, October 3, 1853. A fine edition of his *Œuvres*, in 17 vols. (Paris, 1855-60), has been published by Barral.—His son, **Emmanuel A.**, born at Paris, 6th August 1812, is a distinguished member of the French bar, and a notable

politician of the party of the Left.—**Étienne A.**, brother of the astronomer, and a well-known playwright and journalist, was born at Estagel, near Perpignan, 7th February 1803. He has held several State offices, and was mayor of Paris during the Franco-Prussian war.—**Jacques Étienne Victor A.**, another of the brothers A., was born at Estagel, 10th March 1790. He was artist to the Government expedition of 1817-20, under Freycinet, described in his *Promenade autour du Monde* (1822). He wrote many plays, but while still young was suddenly afflicted with blindness. His *Voyage d'un Aveugle en Californie* is the record of a hapless expedition to the gold-fields of California, headed by A., who died 1st January 1855.—**Jean A.**, the fourth brother, a distinguished general in the Mexican service, born in 1788, sailed for the New World in 1815, and died in 1836. Santa Anna owed to him a great part of his first successes.

Aragon, a former province in the N.E. of Spain, embracing the three modern provinces of Saragossa, Huesca, and Teruel. It is bounded N. by the Pyrenees; E. by Catalonia and Valencia; S. by Valencia and New Castile; W. by Old and New Castile and Navarre. Its greatest length from N. to S. is about 200 miles; its greatest breadth is 130 miles; and its area 14,720 sq. miles.

The central part of A., through which the Ebro flows, receiving the waters of many rivers, is level. The N. and S. portions are mountainous. The Pyrenees send down long spurs into the district. Except on the banks of the Ebro the plain country is not fertile, being badly supplied with water. There is, however, splendid vegetation in the Pyrenean valleys, where wheat, rye, maize, barley, &c., are plentifully produced. Excellent timber grows on the mountains, and rich pasturage abounds. In the plains the climate is sultry, but on the hills it is temperate. Among the minerals are copper, lead, iron, salt, saltpetre, amber, and coal. The bear, wolf, and lynx inhabit gorges of the Pyrenees, and merino sheep are reared in great quantities. The manufactures are unimportant. The people of A. are brave and active, but proud, cold, and stubborn. They are true friends, but fierce enemies; and hence their country has often been the scene of the most embittered and bloody strife. The population

in 1871 was 928,718. Chief towns, Saragossa, Teruel, Huesca, and Calatayud.

Conquered by the Romans at an early period, A. afterwards came into the possession of the Visigoths, and in the 8th c. of the Arabs, from whom it was subsequently wrested by the Christians. It was then governed by its own monarchs until its union with Castile in 1469, on the marriage of Ferdinand and Isabella.

Arago'na, a town of Sicily, 8 miles N.N.E. of Girgenti. Pop. 7947. The ancient castle of the princes of A., a vast structure in the Renaissance style, is rapidly becoming a ruin. The mud-volcano of Maccaluba is near A.

Aragonite, or **Arragonite**, a mineral named from Aragon in Spain, composed chiefly of carbonate of lime, with a small percentage of carbonate of strontia and sometimes magnesia. It frequently occurs in compound crystals, chiefly white, but sometimes tinted with yellow, green, or violet, and when it has a silky lustre it is known as satin spar. In this last form it is used for small ornamental articles in the same way as alabaster.

Araguay, also **Rio Grande**, a large river of Brazil, rises in 18° 10' S. lat., among the southern sierras, and is about 1000 miles long. It flows N., surrounding in its course an island (Santa Anna) over 200 miles long, and joins the Tocantins at San Joao das duas Barras. The valleys of this river are so richly beautiful that the region is known as the 'Garden of Brazil.'

Aral Sea of (lit. 'Island Sea'), the 'Blue Sea' of the Russians, a great lake to the S. of the Russian government of Orenburg, about 150 miles W. of the Caspian Sea, between 43° 42' and 46° 44' N. lat., and 58° 18' and 61° 46' E. long. Area, 26,650 sq. miles; lying 243 feet above the Caspian. Its waters are brackish. The Sir (anc. *Jaxartes*) and Amu (anc. *Oxus*) are its only feeders, and it has no outlet. In the opinion of Rawlinson and others it was dry land during the Greco-Roman period, and again during the 13th and 14th centuries after Christ, the Jaxartes and Oxus then entering the Caspian. The restoration of the Oxus to its old bed is being attempted (1875) by the Russian government. There is a Russian squadron stationed at Kazala (q. v.), which, however, was of too great draught for river service during the Khivan expedition of 1873.

Aralia and **Aralia-cææ**, a genus and order of Dicotyledonous trees, shrubs, and herbaceous plants found both in tropical and cold regions. The common ivy (*Hedera Helix*) and the moschatel (*Adoxa Moschatellina*) are the only representatives of the order in Britain. The plants have generally aromatic and stimulant properties. *Panax Schinseng* furnishes a stimulating drug, much used by the Chinese under the name of ginseng, and *P. quinquefolium* possesses similar properties. *P. fruticosum* and *P. cochleatus* are used as aromatic medicines in the East. The pith of *Fatsia* (Arabia) *papyrifera* forms the famous rice paper of China. *A. nudicaulis* of N. America has a fragrant and aromatic root, which is used as a substitute for Sarsaparilla (q. v.), and is also said to be used as a remedy against syphilis, and as an application to fresh wounds. Some American species of A. yield an aromatic gum resin. *A. spinosa* is called angelica-tree and toothache-tree in N. America.

Aram, Eugene, the hero of poem, drama, and romance, was the son of a gardener, and was born at Ramsgill, Yorkshire, 1704. He pursued learning with avidity, though his poverty retarded his progress in this direction. He married early, became a schoolmaster, and settled at Knaresborough, where he contracted a friendly alliance with one Daniel Clark, a shoemaker. The sudden disappearance of the latter, while in the temporary possession of a quantity of valuable property, threw suspicion upon A., and the schoolmaster's garden having been searched, a quantity of the missing property was found. A. was consequently tried, but acquitted for want of evidence. Leaving Knaresborough he travelled through a considerable part of England, eventually becoming usher of Lynn Academy, Norfolk. While thus engaged, his secret was betrayed by a confederate: the skeleton of the murdered man was exhumed and identified, and A., tried at York, 3d August 1759, for murder, was found guilty, and condemned to be executed within three days. He had conducted his own defence with consummate ability—his great speech being remarkable for its learning and close reason-

ing. Before his execution he confessed his guilt, wrote a defence of suicide, and endeavoured to practically illustrate his theory; but failing to gratify his desire in this direction, was executed according to sentence. His studies were mainly philological, and he had acquired a knowledge of Chaldee, Arabic, Welsh, and Irish. At the time of his apprehension he was engaged upon a *Comparative Lexicon of the English, Latin, Greek, Hebrew, and Celtic Languages*. In Lord Lytton's romance of *Eugene Aram* (later editions), a very interesting and learned essay by A. on an antiquarian subject will be found. More exquisitely genuine than this romance, however, is the poem of Hood on the same subject.

Aram'sa (Heb. *Aram*, the plateau or highland), the country N.E. of Palestine, bounded N. by Taurus, E. by the Tigris, S. by Arabia, W. by Arabia and Phœnicia, and corresponding to the Mesopotamia of the Greeks. The language of the country, called *Aramaic*, was divided into two dialects, that of the W. being the Syriac, and that of the E. the Chaldee, specimens of which are to be found in Daniel and Ezra. After the Babylonish captivity, the Syriac, or Western Aramaic, gradually superseded the Hebrew in Palestine, and was the vernacular of the Jews in the time of Christ. Everywhere, however, in Syria and Mesopotamia, the Aramaic has now been displaced by the Arabic and Persian, and though it was probably the most ancient of the Syro-Arabian tongues, it only lingers in isolated spots among the mountains of Kurdistan.

Aran'da, Pedro Pablo Abaraca y Boles, Count of, a Spanish statesman, was born 18th December 1718. He was for seven years ambassador of Charles III. at the court of Augustus III. of Poland. A formidable revolt having broken out at Madrid in 1765, A. was made President of the Council of Castile. He restored order in the capital, established the supremacy of the law throughout the kingdom, and energetically introduced a series of liberal reforms in the army, navy, commerce, and agriculture of the country. Having procured the expulsion of the Jesuits, he was, in 1773, through clerical intrigues, got rid of for a time by being sent as ambassador to France. Returning to his old position, he once more lost it through intrigue; and having expressed unpalatable sentiments respecting the war with France that followed the Revolution, he was banished to Aragon, and died there in 1799.

Arañes and Araneidæ. See SPIDER.

Aran'juez (Lat. *Ara-Jovis*), a town of Spain, 28 miles S.S.E. of Madrid, famed for its palace and gardens. The gardens were laid out by Philip II., but the palace, completed by Charles IV., is a reconstruction in the French style, by Philip V., of an older edifice that had been partly destroyed by fire. The residence of the royal family here during the spring formerly brought a great influx of visitors into A., the population of less than 4000 being sometimes increased to 10,000. In the gardens are magnificent elm-trees that were brought from England by Philip II. Here an alliance was concluded between France and Spain against England, 12th April 1772, and here Charles IV. abdicated, 18th March 1808.

Ar'any, János, a Hungarian poet, inferior in reputation only to Petöfi, was born of poor parents at Nagy-Szalonta, March 1, 1817. He studied hard for four years at Debreczin College with the view of entering the Church; but in 1836, wearied of the dull inactive life, threw in his lot with some strolling players. He soon, however, returned to Szalonta, where he settled as a notary. In 1847 he published *Toldi* (the Hungarian Samson), a trilogy which instantly nerved the national sentiment of all classes. A. rose to fame and favour after the Austro-Hungarian war. He has written many poems, some of which are translated into German, the best known being *Katalin* ('Catherine'), a narrative in thirteen cantos. The first part of a second great trilogy, *Buda Haldia*, was crowned by the Hungarian Academy in 1864. In 1874 appeared a humorous epos, recounting his early adventures as an itinerant actor.

Ararat (properly *Airarat*, 'the plains of the Aryans'), the name originally given to the high plain or plateau on the middle Aras or Araxes, which was the earliest home of the old Armenian and Medo-Persian Aryans, and formed, even in the time of the writer of Genesis, a country distinct from Armenia proper; for the phrase in the narrative of the Deluge, 'the mountains of A.,'

obviously means a region and not a particular summit. Still it was quite natural that the name should be transferred to the highest peak in the region, as the spot where in all probability the ark rested. It is known to the natives as *Massis Lessor* ('mountain of the ark'), to the Turks as *Agri-Dagh* ('steep mountain'), and to the Persians as *Kaki-Nuh* ('Noah's mountain'). It is about 12 miles southward from Erivan, and rises in a double peak to the height of 17,212 feet. Politically Mount A. is a prominent landmark, as since 1827 it has indicated the locality in which the Russian, Turkish, and Persian territories converge. The village of Arguri, encircled by gardens and orchards, and tenanted by 1000 inhabitants, formerly stood at its base; but was destroyed by a frightful earthquake, 20th June 1840. Naturalists and other travellers have shown considerable activity in the neighbouring regions in recent years. Mount A. was ascended by Major R. Stewart in 1856, by Dr. Radde, director of Tiflis Museum, in 1870, and by Professor Bryce in 1877.

Aras (anc. *Araxes*; Turk. and Arab. *Ras*, from the Sansk. root *Ara*, swift), the largest affluent of the Kur (q. v.), rises in Turkish Armenia to the S. of the city of Erzerum, and flows E., forming in the middle part of its course the boundary between Russian Transcaucasia and the Persian province of Azerbaijan, and after a course of about 500 miles, joins the Kur, which flows into the Caspian Sea.

Ara'tus, of Sicyon, a Greek statesman and general, born B.C. 271. His father having been slain in a political conflict, A. was, at the age of seven, withdrawn to Argos, whence he returned in his twentieth year. Like most of the cities of the Peloponnesus, Sicyon was then under a tyrant. Protected and encouraged by Antigonos Gonatas, A. succeeded in expelling the usurper, whose name was Nicocles, made the city a republic, and joined it with the Achaian League, his aim being to form a united Greece out of the several states. A. saw the double danger to his country—from Rome and Macedonia—and sought to surmount it by an alliance with Ptolemy of Egypt, but his efforts were unsuccessful. Seventeen times generalissimo of the Achaian League, he was finally, in B.C. 213, poisoned at the instance of Philip II. of Macedon, his disinterested efforts for the liberties of Greece having been frustrated by the petty jealousies of the states. A. wrote a history of the Achaians, which Polybius praises.

Ara'tus, of Soli, Cilicia, wrote about 270 B.C. his *Phainomena*, a Greek astronomical poem, which Cicero translated into Latin. To these was joined his *Diosemia* or *Prognostica*. The quotation made by Paul (Acts xvii. 28), 'We also are his offspring,' is from A., whose fellow-countryman the apostle was. The *editio princeps* of A. was published by the elder Aldo Manuzio (Ven. 1499); the most complete edition is that of Buhle (2 vols. Leipz. 1793-1801), but there are later ones by Buttmann (Berl. 1826), Bekker (Berl. 1829), and Köchly (Paris, 1851).

Arauca'nia, an independent state, within the boundaries of Chili, between 36° 44' and 39° 50' S. lat., and 70° and 74° 30' W. long. It rises from the Pacific to the Andes in three great terraces, and its productions resemble those of Chili. Area about 25,000 sq. miles; pop. estimated (1868) at 300,000. From 1537 to 1773 A. waged an almost constant war of independence with the Spaniards, and is the only country of the New World whose aboriginal race has successfully resisted European inroads. Of late years (1870) it was at war with Chili, stirred up by a French adventurer named De Tonneins, who had assumed the title of King Orelío Antoine I., and is striving to form in A. a constitutional monarchy. Los Angeles is the capital, with 3960 inhabitants. See Smith, *The Araucanians* (New York, 1855); *Ordie Antoine Ier Roi d'Araucanie et de Patagonie, par lui-même* (Paris, 1863); and Aimard, *L'Araucan* (Paris, 1864).

Araucaria, a genus of Coniferous, Evergreen trees found in the southern hemisphere. *A. imbricata*, called Chili pine or 'puzzle monkey,' is the only species which will bear the climate of Britain, but occasionally during severe winters it is much injured. It is found growing in large forests on the mountains of Southern Chili, where it attains the height of 150 feet. Its wood is yellowish-white, hard and durable; its cones are large and round, and its seeds are eaten either raw or roasted. *A. Bidwillii* or the Bunya Bunya is a handsome tree found in Queens-

land; its cones and seeds are larger than those of the preceding species, and the latter are eaten by the aborigines. *A. brasiliensis* is the Brazil pine, where it forms forests, and its seeds are used as an article of food. The Norfolk Island pine, *A. (Eutaxia) excelsa*, is grown in conservatories in Britain. *A. (Eutaxia) Cunninghamii* is the Moreton Bay pine.

Araucarioxylon, a genus of fossil trees found in the Carboniferous sandstone. In the neighbourhood of Edinburgh specimens have been met with in the Granton, Craigleith, and Redhall quarries. One obtained from Craigleith is exhibited in the Edinburgh Botanic Gardens, which measures 30 feet 8 inches in length, and 6 feet across at the lower end of the trunk. Full details regarding this and other specimens of *A.* have been given by Sir Robert Christison, Bart., in *Transactions of the Royal Society of Edinburgh*, vol. xxvii. In structure and appearance *A.* resembles *Araucaria* (q. v.) of the present day.

Araújo d'Azevedo, Antônio, a celebrated Portuguese statesman, known in political life as the Count da Barca, was born near Ponte de Lima, May 14, 1754, and was successively ambassador at the courts of Holland and Russia, Secretary of State (1803) and Prime Minister of Portugal (1806). The wide industrial knowledge which he had acquired by his observations in England and France was now put in use for the benefit of his country, and he made great efforts to establish different kinds of manufactures in Portugal. Following the royal family to Brazil on the temporary triumph of the French invaders (1807), he immediately set about improving the agriculture and manufactures of that rich country; and founded, in 1816, a school of fine arts at Rio Janeiro. *A.* died at Rio Janeiro, 21st June 1817.

Araúre, a town of Venezuela, S. America, about 160 miles S.W. of Caracas, near a spur of the Andes, that runs up to the Venezuelan coast. Pop. 10,000. The neighbourhood is well watered and fertile; coffee and cotton are grown, but cattle-breeding is still the most important industry.

Aravull'i (Aravil), a mountain-range of N.W. India, running for 300 miles N.E. through the states of Rajputana. The average elevation is from 1000 to 3000 feet; highest peak, Mount Abu, is 5000 feet. The slopes are bare of vegetation, and give birth to few rivers. Of these, the Luni drains into the Rann of Cutch, the Chumbal into the Ganges.

Arbalest, Aroubalest, or Cross-Bow, a famous weapon in mediæval wars, gave place in the 14th c. to the long-bow, which was found to be much more convenient in battle. The *A.* consisted of a bow fastened cross-wise upon a stock. When the bow was bent, the string was caught up by a kind of spring in such a way that upon pulling a trigger the string was loosed and shot a short and stout arrow, commonly called a *quarrel*, forward with considerable velocity. The window or opening through which the arbalesters or cross-bowmen discharged their bolts was called an *arbalestina*.

Arbela, now Erbil, a small Assyrian town, 40 miles E. by S. of Mossul, near which at Gaugamela, Alexander finally defeated Darius, B.C. 331, and subverted the Persian empire.

Arbitration is the adjudication by one or more persons, at the request of parties who are at variance, to end the matter in dispute; the object being generally to prevent the loss of time and the expense incident to procedure in a law court. Usually these ends are to some extent gained, but an *A.* is nevertheless a lawsuit, the judge in which has to be paid by the litigants; nor does the procedure prevent the possibility of ultimate appeal to a court of law. The act or deed of reference is called the *submission*; the judge appointed by it is called the *arbitrator* or *arbitrator*. When reference is made to more than one arbitrator, with provision that, should they disagree, another shall decide, that other is called an *umpire*.

'Arbitrations are of two kinds: first, where there is a cause pending in court; and secondly, where there is no cause pending. The submission in the former case is either by rule of court, or judges' order before the trial, or by the order of *nisi prius* at the trial. In the second case, the submission is by the agreement of the parties, which is either in writing or by parole; or by the positive direction of an Act of Parliament, as in the case of the Inclosure Acts. Submission to *A.* by rule of court is not revocable by either party without leave of the court. The court may order the

attendance of witnesses and the production of documents. Disobedience to the order is contempt of court. The submission becomes void by the death of an arbitrator, or of one of the parties to the deed, unless there is a stipulation to the contrary. Every one legally free, and held capable of judging, may be an arbitrator or umpire. Arbitrators have a jurisdiction over the costs of the submission. An award must be in writing, legally executed. It may, however, be made by *parole*, if it is so expressly provided in the submission. The right of counsel to bind his client to an *A.* has generally been upheld by English and Scotch courts, especially by the latter. But in the Court of Common Pleas, in the case of *Swinfen v. Swinfen*, a compromise by her counsel was successfully resisted by the plaintiff.

It is the duty of an arbitrator to base his conclusion upon the same rules of law and equity which would have guided the decision of the court for which he acts as substitute. An award may be set aside on appeal to court, on the ground of corruption and fraud on the part of the arbitrator. A frequent ground of litigation in court following a submission is that in his award the arbitrator has gone beyond the power conferred on him under the submission. Again, an award may be set aside owing to a wrong view of law on the part of the arbitrator; or where his procedure has been plainly unjust; as, where he has not fully heard the parties, or when he has taken a proof in the absence of one of them. Thus, as we have said, it by no means follows that an *A.* is a short cut to the end of a litigation. The burden of proof, however, always lies on the party wishing to set aside the award, or any part of it. And, on the other hand, if there is no manifestly wrong application of law, the court will not consider the matters of dispute merely on their own merits. The *A. Act*, 1872 (35 and 36 Vict. c. 46), makes further provisions for *A.* between masters and workmen, and applies the Masters and Servants Act (30 and 31 Vict. c. 141).

An arbitrator who accepts the office is not entitled to renounce it. He is bound to perform faithfully the duty which he has undertaken, and he may be compelled by law to do so, and to execute his award.

Arbo'ga, an old city in the province of Westmannland, Sweden, lies on a stream of the same name, near where it enters Lake Mälär. It is only now of historic interest, having been at one time a residence of the royal family of Vasa, and the scene of many Church assemblies and diets. The *A. Articles* (1561) gave Eric XIV. a check on the power of his nobles; and in 1625, Gustavus Adolphus issued at *A.* an edict relating to the coin of the realm. Pop. (1872), 3393.

Arborescent, a term applied to plants having a tree-like character, however dwarf they may be.

Arboricultural Society. The Scottish *A. S.* is the only society of the kind in Britain. It was instituted in 1854, and has now a membership of about 800, consisting of proprietors, nurserymen, factors, land-stewards, and foresters. The Queen is patron. The object of the society is the promotion of arboriculture in all its branches, by periodical meetings for the reading and discussion of papers, the offering of prizes for essays and reports on the practical operations of forestry, and the publication of these papers. The society has published 7 vols. of transactions.

Arboriculture. The cultivation of forest-trees and shrubs is one of the most interesting and important of the rural arts. Scientific men have recently shown that trees exercise a great and benign influence on the health and death-rate of a country, so that their conservation and cultivation has now become a subject of national importance, not only as regards Great Britain, but also her colonies and Indian empire. Within the last hundred years the landscape of Britain has undergone a complete change from the extensive planting of trees, and many of the bleak and barren hills and tracts of waste ground are now occupied by thriving plantations, thus improving the health of the people, as well as making the adjoining lands more fertile and valuable, and thereby materially increasing the food-production of the country. To cultivate timber-trees successfully, many things have to be carefully attended to, such as soil and situation, draining and fencing, selection of plants, mode of planting, and judicious thinning and pruning.

In forming plantations, the object always held in view is the

production of revenue, shelter, or ornament. One or other of these ends can invariably be obtained, and not unfrequently a harmonious combination of all three. There are two classes of timber-trees—viz., the *hard-wooded* and the *soft-wooded*. The former are illustrated by the oak, elm, ash, beech, birch, hornbeam, Scotch fir, &c. and the latter by the poplar, willow, lime, horse-chestnut, &c. Some trees will grow well in exposed situations, such as the Scotch fir and oak; while others, which are not natives of Britain, require a good soil and shelter, such as the lime and horse-chestnut. The cluster pine (*Pinus Pinaster* var. *maritima*), the plane or sycamore, the elder, and the buckthorn are adapted for planting in situations exposed to the sea-breeze.

Sometimes plantations are formed of only one kind of tree, but more frequently a mixture of different sorts are employed, some being destined for the permanent crop, while others act as *nurses*, and are gradually removed as the plantation increases in growth. Spruce and larch make the best and most profitable *nurses*.

The rearing of timber-trees on land unfitted for agricultural crops is very remunerative, the return being on an average £1 per acre for every year the trees have occupied the ground. Hedgerow-trees are planted either for ornament or shelter. See articles **TRANSPLANTING** and **COPPICE**.

For full directions as to the practical operations of A. we refer the reader to Brown's *Forester*, and *The Transactions of the Scottish Arboricultural Society*.

Arbor Vitæ, in anatomy, a name given to the arborescent or leaflet appearance shown in a section through the cerebellum. It is produced by the lobes of that organ being composed of leaflets, each leaflet consisting most internally of a layer of white matter composed of nerve-tubes, outside of this a layer of granular nerve-cells, and still more externally a fenily molecular layer. See **CEREBELLUM**.

Arbor Vitæ, the name given to certain species of Evergreen, Coniferous, shrubby trees, belonging to the genus *Thuja*. The origin of the designation is uncertain. The common A. V. of gardens is *T. occidentalis*, a native of N. America, and grows to the height of 40 feet. The plant possesses an aromatic odour, and the young twigs have been used in cases of rheumatism, on account of their causing sweating. *T. (Biota) orientalis*, the Chinese A. V., is also cultivated in Britain. It has a somewhat pungent, aromatic odour, and its wood resists the action of moisture for a long time. The derivation of the generic name *Thuja*, is from *thyon*, sacrifice.

Arbroath, or **Aberbroth'wick**, a seaport in Forfarshire, at the mouth of the Brothock, 13 miles S.E. of Forfar. In 1178 King William the Lion here founded an abbey, in which (1214) he was buried, and where the Scottish nobles met (1320) to oppose the aggressive claims of Edward II. The abbey, next to Holyrood, the richest in Scotland, was destroyed (1560) by the Reformers; its ruins are still picturesque. A. is now a busy town, with much flax and jute spinning, and large leather and sail-cloth manufactures. The vessels of the port (1873) numbered 65; tonnage, 9362. The exports are grain, potatoes, fish, and paving-stones. A. is a royal burgh, and unites with the burghs of Montrose, Brechin, Forfar, and Bervie to send one member to Parliament. Pop. (1871) 19,973. About 12 miles S.E. the well-known Bell-Rock Lighthouse rises from the sea.

Arbuthnot, John, physician, littérateur, and wit, the friend and companion of Pope and Swift, and the most learned of the knot of brilliant satirists of the reign of Queen Anne, was a cadet of the old Scottish family of the same name. He was born at Arbuthnot, near Montrose, about 1675, studied medicine and graduated at Aberdeen. His father, a clergyman of the Scottish Episcopal Church, being deprived of his charge at the Revolution, young A. removed to London, where for a time he maintained himself by teaching mathematics. He owed his introduction to the court to accident, and the first royal favours he received were in acknowledgment of professional services. Appointed court physician in 1709, he had serious reason to regret the death of the queen in 1714. Referring to the effect of this event upon himself, he says, in a letter to Pope, 'This blow has so roused Scriblerus that he has recovered his senses,' &c., a passage which establishes his copartnership in the authorship of the *Memoirs of Martinus Scriblerus*, the first book of which, forming a powerful satire upon the abuses of human learning,

was exclusively A.'s production. His letters are remarkable for their wit, and also for their somewhat melancholy and savage irony, which may in his case, as in that of Swift, have been spontaneous and natural, but was probably developed, to some extent at least, by companionship with the author of *Gulliver*. His literary reputation, however, most securely rests on his satirical *History of John Bull* (1712), a political *jeu d'esprit* ridiculing the quarrels of nations, the inspiration of which has fired every pamphleteer down to the author of *The Fight in Dame Europe's School*. A. is also the author of a number of essays on scientific subjects. He died, February 27, 1735, at Hampstead.

Arbutus, a genus of trees and shrubs belonging to the natural order *Ericaceæ* (q. v.), or the Heath family. They are chiefly found in the S. of Europe and N. America. *A. Unedo*, the strawberry-tree, grows abundantly on the rocks at Killarney, in Ireland, and is also found in Asia and N. America. In Corsica a wine is made from its fruit, and both a sugar and a spirit are obtained from it in Spain. In Greece its bark and leaves, which are astringent, are used for tanning some kinds of leather. All the species possess more or less narcotic qualities.



Arbutus Unedo.

Arc (Lat. *arcus*, a bow) is any portion of a curved line. The chord of an A. is the straight line joining its extremities, and is always less than the A. The A. of a circle is proportional to the angle which it subtends at the centre.

Arc, Joan of. See **JEANNE D'ARC**.

Ar'ca, or **Ark-Shell**, a genus of Lamellibranchiate mollusca, forming the type of the family *Arca*, in which the shell is equi-valve, the hinge long and toothed, the muscular impressions symmetrical, the foot large and deeply grooved, and the mantle lo' not united. The valves of the shell are 'boat-like' in form, hence the popular name. Three or four species are British, the most familiar being the *A. tetragona*. The *A. noce* is a Mediterranean species.

Arcade, in architecture, a series of arched openings attached to a building. The use of arcades was developed from the introduction of the circular arch into Roman architecture. In its modern use the term has come to be wrongly applied to any covered way, whether arched or not, and by an A. a glass-roofed roadway lined with a series of booths or small shops is now generally understood.

Arca'dia, the central portion of Peloponnesus, took its name, according to mythic legend, from Arcas, son of Callisto, though the name is better explained as denoting the 'land of bears,' from its dense oak and pine forests having been the resort of numbers of these animals. It was encircled and traversed by mountains, and was thus cut off, to a great extent, from its neighbours. The western part, rugged, and clothed with dense forests, was bleak and sterile; but the eastern part possessed some fertile valleys, and in these were situated its chief cities. The highest peak was Cyllene (7778 feet); the chief river, Alpheius (q. v.). The Arcadians were long rude and barbarous, and their livelier and more polished neighbours used their name as a synonym for a simpleton. They were fond of music and dancing. Their mode of life was pastoral, and Pan was their favourite divinity. 'Arcadian song' is another expression for pastoral poetry, and the poets represented A. as the abode of song, felicity, innocence, and peace.

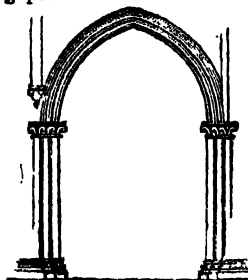
Arca'dius, first Emperor of the East (395-408 A.D.), born in Spain in 377 A.D., was the elder son of Theodosius the Great, at whose death the division of the empire into East and West took place. A., effeminated by luxury and sloth, suffered the empire to be ruled in turn by Rufinus, Eutropius, Gainas, and his wife Eudoxia, known principally by her inveterate persecution of Chrysostom, whose exile she procured in 404, for his persistent opposition to the doctrines of Arius. A. died in 408 A.D., leaving the empire to his son, Theodosius II., who was a minor. The

greatest event of his reign was the movement of the West Goths under Alaric on Italy, to which they were instigated by Eutropius.

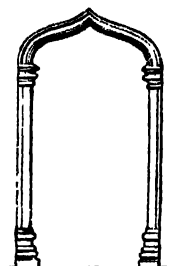
Ar'ce, a town of S. Italy, province of Caserta, 60 miles E.S.E. of Rome. It derives its name (Lat. *arx*, citadel) from occupying the summit of a hill, still crowned by a fortress, *Rocca d'Arce*. Pop. of commune, 5467.

Arce'sila'us, founder of the Middle Academy, born at Pitane, in Æolia, B.C. 316, studied first under Theophrastus the Peripatetic, and then under Crantor, at whose death he became head of the Academy, and gave it a new critical direction, which marks it off historically from the school of Plato. His position was that there is no certainty in the knowledge arrived at through the senses, and that dogmatism is not permitted to a philosopher. The ancients complained with justice that there was no system in his teaching, and no conviction in his opinions, which were an eclectic and discordant medley of Platonism and Pyrrhonism. Witty and poetic, he loved the licence of literature more than the restraints of metaphysical dogmatism, and went to the *Iliad* (according to his own phrase) 'as to a mistress.' Diogenes Laertius has preserved some of his *bon-mots* and epigrams in his Life of A., who loved controversy, though not a fanatic, and who combated with keenness and vigour the stern conclusions of the Stoics. His death (B.C. 241), in his seventy-sixth year, is said to have been caused by excess in wine.

Arch, an architectural erection sustained by the mutual gravitating pressure of the individual parts. It seems to have been



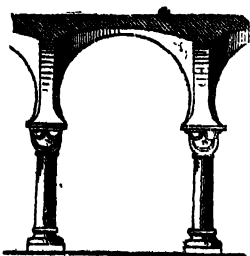
Pointed Arch.



Tudor Arch.

known and used by the ancient Egyptians; and as representations of arched gates are frequent in Assyrian bas-reliefs, it is certain that this nation was also acquainted with the principle. The A. never appears in the architecture of the ancient Greeks; and it was only in later ages that the Romans introduced it, having probably borrowed it from the Egyptians. Gradually, however, the A., as a principle in architecture, gained ground, passing during the dark and middle ages from the simple semicircle to the segment and ellipse, from these to the more complicated horseshoe, pointed, trefoil, cinquefoil, and polyfoil arches, until at last it arrived at the graceful decorative *ogee* and *Tudor* arches. The peculiarity of shape of most of these is indicated by the name. The sides of an A. are called the *haunches* or *flanks*, the top part the *crown*, the wedge-shaped stones or bricks of which it is formed the *voussoirs*, the highest being the *keystone*, and the lowest the *springer*; the under sides of the *voussoirs* are the *intrados*, the upper the *extrados*.

Arch, Triumphal, among the Romans an insulated structure, erected across some main street of the city, to commemorate



Horseshoe Arch.

(1) the triumph of a victorious general; (2) a victory for which no triumph had been granted; and (3) sometimes events other than victories. It took its origin from the *Porta Triumphalis*, the gate through which the triumphing general led his army into the city. Stertinius (B.C. 196) first erected a T. A. at Rome; six years later another was erected by Scipio Africanus; and under the emperors they became numerous and splendid. Twenty-five in all are recorded

as having been erected at Rome, of which the Arch of Titus, with bas-reliefs of the spoils of the temple at Jerusalem carried in procession, is specially interesting and magnificent.

Archæol'ogy, the study of the evidences of the manners and customs of ancient times. The wide field of investigation denoted by the term causes it to be somewhat vague. In its popular and narrower meaning, A. concerns itself with the monumental, written, and traditional evidences of the ancient condition of a country. In its wider meaning, it is used as a collective term for several distinct branches of knowledge, bearing on the origin, laws, religion, language, science, arts, and literature of ancient peoples. The evidences of these are sought for in philology, ethnology, mythology, &c. For long archæologists were occupied almost solely with the antiquities of ancient Greece and Rome. The discovery of the famous Rosetta stone in recent times, by giving a key to the hieroglyphics, has enabled A. profitably to give its attention to the history and records of the civilisation of the ancient Egyptians. The discoveries of Layard and George Smith at Nineveh are among the most interesting and instructive of our day; and perhaps not less so are those of Mr Wood at Ephesus. Mediæval A. began to be cultivated about the middle of the 16th c. The following are probably the most celebrated archæological collections of Europe: The Royal Museum of Naples, which contains the objects gathered from the ruins of Herculaneum and Pompeii; the Museums of the Louvre at Hôtel de Cluny in Paris; the British Museum in London, established in 1753; and the Museum at Copenhagen of the Royal Society of Antiquaries of the North.

Archæopteryx, a remarkable extinct or fossil bird-genus, the remains of which—forming a single specimen only—were discovered in the lithographic slates of Solenhofen in Bavaria; rocks belonging to the Upper Oolite system. It presents characters closely approaching those of reptiles. The tail is elongated and reptilian. It was longer than the body, and each segment or vertebra supported a pair of quill-feathers. No ploughshare bone or pygostyle, present in all existing as well as fossil birds, terminated the tail in this form. It had two free claws developed in the wing, which claws are possessed by no other living or fossil bird. The metacarpal bones were not ossified together, as in all other birds. It equalled a rook or crow in size, was probably a vegetable feeder, and perched on trees. The *A. macrura* is the only species. It is made the type of a special order (*Saurura*) of birds by Huxley.

Archangel (Gr. *arch-on*, a chief, a captain, and *angelos*, an angel). According to the later, more fully-developed Jewish notions regarding angelic beings (see ANGELS), there were different degrees and classes among them. Such a celestial hierarchy is referred to by Paul, Rom. viii. 38, Eph. i. 21, and Col. i. 16. The same apostle mentions an A., 1 Thes. iv. 16. Michael, called an A. by Jude (9), is also mentioned in Daniel (x. 13, &c.), and in the Apocalypse (xii. 7). In the apocryphal Book of Tobit (xii. 15) Raphael calls himself 'one of the seven holy angels, which . . . go in and out before the glory of the Holy One.' According to another Jewish tradition, four principal angels stood round the throne of God: Michael, Gabriel (Dan. viii. 16, &c.; Luke i. 19, &c.), Raphael, and Uriel (2 Esdras iv. 1).

Archangel (properly **Archangelsk**), the capital of a department of the same name in Russia, lies on the Dwina, about 40 miles above where it enters the White Sea. The Norsemen made trading expeditions to this region as early as the 10th c., and Englishmen began to resort hither after the middle of the 16th c. to carry on an overland trade with Persia and India; but the town proper was first founded in 1584, and was named after a monastery dedicated to the archangel Michael. It was for 120 years the only port of Russia, and though its trade fell off greatly after the founding of St Petersburg, it has of late years risen again, and A. is once more the chief entrepôt for Siberia; but the harbour is only clear of ice from July to September. The houses are mostly built of wood, and the trade is chiefly in train oil, furs, timber, wax, iron, and caviare. A. is the see of a bishop. Pop. 19,936.

Archangel, New. See SITKA.

Archbish'op (Gr. prefix, *archi*, chief, and *bishop*), a bishop

who has rule over several other bishops, as well as his own diocese. The office and title arose in connection with the provincial councils which began to be held in the Church in the 2d c. Of the delegates (see BISHOP) who met, it was necessary that some one should preside and exercise a certain authority. This pre-eminence was generally conceded to the bishop of the city in which the council met, generally the metropolis of a civil province. Hence arose the office and title of Metropolitan (bishop), which by the addition of certain other prerogatives were developed into those of A. The Council of Antioch (341) gave the metropolitans jurisdiction over several dioceses, which were called their *province*, and a pre-eminence in rank over other bishops. The title of A. was first used by Athanasius in the 4th c.; in the West it was not adopted till the 8th c. After the hierarchy of the Church was fully established, besides what were absorbed by the Pope, the privileges of archbishops were chiefly these: Jurisdiction over the bishops of their province in ecclesiastical matters, and an appellate jurisdiction over the bishops' courts; the right of convening the provincial council and presiding in it, of enforcing the rules of the Church, and of correcting abuses.

In England there are two Protestant archbishops—the A. of Canterbury, who has the title of Primate of all England, and ranks next to the royal family and its immediate relatives; and the A. of York, who has the title of Primate of England, and ranks next to the Lord Chancellor—and one Roman Catholic A. of Westminster. In Ireland there are two Protestant and four Roman Catholic archbishoprics; and in Scotland there were, in the 16th c., two Roman Catholic archbishoprics (St Andrews and Glasgow), now there is but one.

Archdeacon (Gr. prefix, *archi*, chief, and *deacon*) was originally the chief of the deacons in a metropolitan church. But in the 5th c. archdeacons became the assistants and representatives of the bishops. Until the 9th c. they were only delegates of the bishops, but after that they became independent officials. After the 13th c. their power again declined, and the office is now almost wholly abolished in the Roman Catholic Church. It still exists, however, in the Church of England, in which the archdeacons act as the deputies of the bishops, especially in the duty of parochial visitation.

Archduke, a title superior to that of duke, and first assumed by the Dukes of Austria in 1156, to mark their equality in rank with the electoral princes of the empire, but their right to it was only confirmed in 1453 by Frederick III. A. is now only an Austrian, not a Germanic, title, and is taken by all the sons of the emperor. The daughters are archduchesses.

Archegosaurus (Goldfuss), a genus of fossil or extinct *Amphibians* (frog-like animals), the remains of which occur in the Carboniferous rocks. These animals belong to the order *Labyrinthodontia* (q. v.), the extinct order of the class *Amphibia*; and by Professor Owen, A. has been made the type of a distinct group, to which he has given the name *Ganocephala*. By some paleontologists the A. is accounted the immature form of some amphibian. The head was defended by bony or *ganoid* plates. The occipital condyles were not apparently ossified. The skull is flattened and triangular in shape. The teeth are conical in form, and possess a labyrinthine structure. The fore and hind limbs were small, and adapted for swimming. A perfect spine was undeveloped, a *notochord* supplying its place. The ribs were short and straight. The feet were provided each with four toes of slender make. The A. remains were first discovered in the clay-slates of the Bavarian coal measures, and were also found in the coal-field of Saarbruck, near Treves. These animals were at first deemed to be fishes; but Gergen, Meyer, and others subsequently remarked and maintained their amphibian characters. Three or four species are known.

Archelaus, the name of several persons of note in antiquity.—1. A., a mythic Heraclid, son of Temenus, was banished by his brothers, and fled to Macedon. Alexander the Great was supposed to have been descended from him.—2. A., illegitimate son of Perdiccas II. of Macedon, gained the throne by perpetrating three murders, and ruled from B.C. 413 to 399. He patronized literature and art, and Euripides and Zeuxis were guests at his court. He is said to have been murdered by a favourite named Craterus, either from ambition or contempt.—

3. A., the greatest of the generals of Mithridates, was a native of Cappadocia. He was sent by his master into Greece with a great fleet and army, overran and conquered nearly the whole country, and was on the eve of reorganising a league against the Romans, when Sulla met him at Chersonesus, and so completely defeated him, that of an army of 120,000 men only 10,000 could be rallied after the battle. A fresh army of 80,000, after two days' fighting, sustained an equally signal defeat at Orchomenos. Becoming suspected by Mithridates, he deserted to the Romans B.C. 81, and then vanishes from history.—4. His son, of the same name, married Berenice, Queen of Egypt. After reigning six months, he was slain in a battle against Gabinius, B.C. 55.—5. A., son of Herod the Great, succeeded under his father's will, but being accused of tyranny by the Jews in the tenth year of his reign, he was deposed by Augustus, and banished to Vienna, in Gaul, where he died.

Arch'enholtz, Johann Wilhelm, Baron von, a German *littérateur*, born at Dantzic, September 3, 1745; served in the Seven Years' War, but did not secure the good opinion of Frederick the Great, and was dismissed after the peace in 1763. For sixteen years he wandered about Europe as a sort of *chevalier d'industrie*, and on his return to Germany settled at Hamburg, where he lived mainly by his pen. He wrote an animated and picturesque *History of the Seven Years' War* (2 vols. Berl. 1793, 9th ed. 1867), and several other historical and biographical works, of which, perhaps, the most valuable and interesting is a history of the buccaneers who infested the W. Indies in the first part of last century. A. died at Oyendorf, in Holstein, 28th February 1812.

Arch'er or Shooting Fish (*Toxotes*), a genus of fishes belonging to the family *Squamipennes* ('scaly-finned'), of the group *Acanthopterygii*. Their popular name is derived from their habit of shooting drops of water at insects which light on aquatic plants, in order to cause the insects to drop into the water, and so become their prey. The soft and spiny part of the dorsal fin is covered with scales like the rest of the body. Numerous teeth, closely set in the mouth, exist. These fishes inhabit tropical seas. The *Toxotes jaculator* of the Ganges and Indian Ocean is a familiar species. This form can project drops of water to a height of 3 or 4 feet.

Arch'ery. Bow and arrow are among the earliest weapons. Thus the Assyrian archers formed both light and heavy troops, using both curved and angular bows, each heavy-armed archer being protected by two shield-bearers. After the second Punic War, the Romans employed *sagittarii*, who marched with the *velites* or light troops. In Christian Europe the bow has been generally used. A capitulary of Charlemagne directs every feudal soldier to have a bow, two strings, and twelve arrows. By 1139, long-bows and cross-bows had become so deadly, that the second Lateran Council prohibited their use. England became noted under Edward II. for long-bow shooting, which often prevailed, as at Cressy and Homildon Hill, against superior numbers. The long-bow, which shot faster, and was more easily carried than the Norman cross-bow or arbalest, was therefore encouraged. Towns were directed to provide butts, and practice was made compulsory, an idea borrowed by James I. of Scotland (Act 1424, c. 18). The importation of bow-staves was enforced on the importers of certain merchandise, the price of bows was regulated, and bowmakers planted in places where required. The self-bow was probably 6 feet long, straight when unstrung, and of ash or yew wood in one piece. (The backed-bow, consisting of two pieces of bent wood fixed in a handle, was not in military use in England, but is still used by Eastern nations.) Lighter arrows were used against an enemy at a distance. At closer quarters the archer was protected by an iron stake thrust in the ground before him. At sieges, combustibles were sometimes fastened to arrow-heads, and signals were given by 'whistling' arrows. Four hundred yards was the *maximum* flight. A general stringent law was passed by Henry VIII., directing every male between seven and sixty years of age to practise A. at 220 yards. From the slow action of the primitive musket, the long-bow was used long after the introduction of firearms. By treaty in 1572, Queen Elizabeth engaged to send Charles IX. 6000 men with long-bows and cross-bows. There is no mention of bows in the Commission of Charles I., issued in 1631, to examine the arms used by the militia. Essex tried to raise a

troop of archers in the Civil War, but by this time military A. may be said to have ceased. The Artillery Company of London kept up the practice of A.; but not till towards the end of last century did it revive as a national pastime. Toxophilite societies came into existence, and in 1844 the Grand National A. Society was started. This holds meetings at which both sexes compete. A self-bow, 5 feet 10½ inches in length, and from 48 to 55 lbs. in pull, is generally used. The backed-bow, with a reflex pull, is said to jar. The arrows are 27 inches long, and either 'self' or 'footed' (i.e., with a piece of hard wood let in at the feather end). 'Cheated' and 'bobtailed' arrows, in which the 'stele' of the arrow diminishes in circumference from the feathers to the 'pile,' and from pile to feathers respectively, are said not to fly straight. The 'bracer' is buckled round the left arm, to protect it from the recoil of the string. The 'ascham' is a sort of movable cupboard for holding A. implements. 'Bracing' and 'notching' are technical terms for stringing the bow and fitting the arrow to the string. The targets are usually made of straw, covered with canvas, and are 4 feet in diameter. The range for flight-shooting is seldom more than 100 yards. The Royal Company of Archers and Queen's Body-Guard for Scotland (created by Act of Privy Council in 1677) still shoot for their silver-arrow prizes at 180 yards. The history of this company has been written by Mr Balfour Paul (Edinb. 1875). Three hundred yards is now thought to be the maximum flight. 'Clout-shooting,' or shooting with heavy arrows over a long range at a wand, is almost abandoned. 'Roving,' or shooting at accidental marks, is sometimes practised.

Archibiosis is a term proposed by Dr Charlton Bastian to designate the production of living forms from a non-living organisable fluid. It is synonymous with the words heterogenesis and spontaneous generation. Many naturalists deny the possibility of any such mode of origin, and hold that living forms must come from pre-existing living forms. See REPRODUCTION.

Archill, or **Orchill**, the name given to a colouring substance obtained from various species of dull-grey coloured lichens, but especially from *Rocella tinctoria*; which grows in large quantities on rocks in the Levant, and on the Cape de Verd Islands. The colour is not originally in the plants, but is developed during putrefaction. A. is soluble in water and alcohol, and is employed chiefly in dyeing silken fabrics a rich lilac colour, which, however, is easily acted on by the sun's rays. *R. fuciformis*, abundant on the coasts of Africa, yields much of the A. or Orchilla weed of commerce. Angola A. is regarded as the best quality. The Spanish name Orciglia is that from which the names A. and O., as well as the generic name *Rocella*, are derived. Cudbear (q. v.) and Litmus (q. v.) are analogous to A.

Archilochus, of Paros, flourished about 714-676 B.C., one of the earliest Greek lyric and elegiac poets, was the son of Telesicles, and of a slave named Enipo. He conducted a colony from Paros to Thasos, and while here lost his shield in a contest with the Thracians. Repairing to Sparta, he was soon banished, probably from the licentiousness of his verses; and returning to Paros, he fell in a battle against the Naxians. The fame of A. is founded on his satiric iambic poetry, in which, by the consent of the ancients, he held undisputed pre-eminence. Like Homer, Pindar, and Sophocles, he was ranked as chief in his own department. His satire was merciless and scathing, and his words unmeasured in their licence. Lycambes, who had promised him his daughter Neobule in marriage, but afterwards refused her, was, together with his family, satirised with such malicious skill, and with so much force and point, that his daughters are said to have hanged themselves. His imitator Horace calls 'rage' (*rabies*) the special feature of his muse. This he expressed by means of the iambus, which gives a light tripping movement. He was also the inventor of the *epode*, in which a shorter verse is subjoined to one or more longer ones. The extant fragments of A. are contained in Bergk's *Poeta Lyrici Græcorum* (Leipzig, 1843 and 1854).

Archimandrite (Gr. *archi*, and *mandra*, a fold, a monastery), in the Greek Church, the title of the superior of several monasteries, and corresponding to that of Abbot Superior in the Roman Catholic Church.

Archimedes, the most famous of ancient mathematicians,

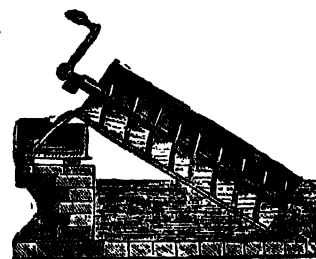
was born at Syracuse about the year 287 B.C. His remarkable penetration of mind is shown in connection with the crown which Hiero, King of Syracuse, had commissioned his goldsmith to make of pure gold, but which was suspected of being composed of an alloy of gold and silver. The king, wishing to detect the fraud without injuring the crown, applied to A., to whom the solution suggested itself on his entering the bath one morning, when he observed that he displaced so much water as to cause it to overflow. This is said to have been the occasion on which he uttered his world-famous *Eureka! Eureka!* ('I have found it! I have found it!') Possibly some such incident led A. to the enunciation of that hydrostatic law known as the Principle of A. (q. v.). Of the numerous inventions ascribed to him may be mentioned the Archimedian Screw (q. v.). The old Greek historian Polybius, and, following him, Livy and Plutarch, write with feelings of astonishment of his mechanical contrivances to baffle the Romans at the siege of Syracuse; but the story of his burning their ships by means of mirrors is first found in Galen, who wrote in the 2d c. A.D. As regards his discoveries in pure mathematics, we may mention his quadrature of the parabola, his treatises on spheres and cylinders, spheroids and conoids, and his investigations on spirals.

A picturesque legend represents A. as slain by a Roman soldier, when Syracuse was captured (212 B.C.), while profoundly engaged with a mathematical problem in the public square. His tomb, on which was engraved a sphere with the circumscribing cylinder, was discovered by Cicero while quaestor of Sicily. A collection of his extant works was edited by Torelli at Oxford in 1792; a French translation, by F. Peyrard, was published at Paris in 1808; and a German one, by Nizze, at Stralsund in 1824.

Archimedes, Principle of, a most important hydrostatic law, discovered by Archimedes the Syracusan, which may be enunciated thus: When a body is immersed in a specifically lighter fluid, the weight lost by the body is equal to the weight of the quantity of fluid displaced. See HYDROSTATICS.

Archimedian Screw is a machine for raising water, said to have been invented by Archimedes during his stay in Egypt, in order to irrigate some portions of land which were above the direct influence of the Nile.

In its simplest form it consists of a tube bent spirally round a solid cylindrical axis, which is inclined to the horizontal at an angle varying usually from 35° to 45°. Suppose now that a small solid body is placed in the lowest bend of the tube, and the screw turned round in a direction opposite to that of the hands of a watch, it is evident that as each point of the screw will successively pass beneath the body at the lower side of the cylinder, the body will ultimately be found at the upper end. Similarly, if the lower end be immersed in water, the continual turning of the screw will raise the water until it flows out at the top. Machines differing only in detail from this are used extensively in Holland.



Archimedian Screw.

Archipelago, a term applied to such tracts of sea as are thickly interspersed with islands, or to the clusters of islands themselves. It was originally applied to, and still especially denotes, that part of the Mediterranean between Asia Minor and Greece. The islands in this A. are divided into the *Cyclades*—Tenos, Andros, Naxos, Melos, &c., belonging to Greece, under which they are noticed; and the *Sporades*—Cos, Scio, Rhodes, Lemnos, Samos, Metelin, &c., belonging to Turkey (q. v.). Other archipelagoes, still more notable geographically, though not historically, are those of the E. and W. Indies, the Aleutian A. in the N. Pacific, and the Patagonian A. at the opposite extremity of the New World.

Architecture, a Latin formation from the Greek prefix *archi*, chief, and *tekton*, a workman, denotes literally the master art or science, but practically signifies the application of artistic

principles to the art of building. In a loose manner, A. and the technical art engineering are frequently confounded, as, for example, when naval A. is spoken of. But the engineer simply takes cognisance of the problems of how best to secure strength, stability, and suitability of a structure without regard to its relation to the æsthetic sense, while the architect has to deal not only with the fitness of a structure for the purposes to which it may be devoted, but with the harmony of its proportions and the beauty of its details. A. therefore ranks as one of the fine arts, and it has fully been described as the 'art of ornamental and ornamented construction.' It is not sufficient for an architect to understand the nature and properties of the materials in which architectural conceptions are embodied, and the technical details by which these are most fitly and durably put together. With these his function as a building engineer ends, but as an architect he must understand the principles of design, and the various qualities which go to form a dignified, impressive, and artistic structure.

A. took its rise from the necessity felt by the human race for some shelter from the vicissitudes of weather. Among the primitive inhabitants of the earth, and still among savage races, there is no scope for architectural display, for all such skill denotes a considerable advance in the arts of civilised life. During the early ages of the world, when implements of stone only were used by the human family, the erections of our ancestors must necessarily have been rude and simple. Nevertheless, such megalithic structures as Stonehenge, and Avebury or Abury, must have possessed a certain grandeur and massiveness from the arrangement and vast proportions of their design, and the evidence of immense labour which they afford. Similarly, the ancient Cyclopean structures, in which huge masses of stone are piled up into rough mason-work, give a vivid sense of power and stability which are among the essential features of true A. Such structures, however, in their rudeness and simplicity, are a faithful reflex of the condition of the people who erected them, as indeed all A. is a measure of the civilisation of the races by whom it has been elaborated.

The development of A. among different races, and in various regions of the world, has been guided by the materials at the disposal of the people, the climate of their lands, their social condition and habits, their intellectual and scientific advancement, and, above all, by their religious beliefs. Thus connected with each distinct growth of civilisation there is a special and characteristic style of A.; and so we have Egyptian, Persian, Indian, Greek, Roman, Byzantine, and Gothic styles, all as distinct as the races with which they originated. Architectural style and remains, therefore, become a valuable adjunct to the study of history, and parallels in the A. of different countries or periods indicate either an amount of similarity in the condition and habits of the races, or a borrowing of the civilisation of the one by the other. The highest efforts of architectural skill have in all ages been put forth in connection with the loftiest conceptions of our race; and as it was in the temples for their deities, or in memorials for apotheosed mortals, that the ancients attained their architectural triumphs, so it is in cathedrals, churches, and places of worship that the purest examples of modern architectural power are exhibited.

Much ingenious speculation has been indulged in to account for the first causes which led to the development of A. along any special line, such as the Grecian or Gothic. The A. of Greece, for example, is affirmed to have its basis in a wooden hut. 'The first ties and posts which were fixed in the earth for supporting a cover against the elements, were the origin of the isolated columns which afterwards became the support of porticos in temples. Diminishing in diameter as it rose in height, the tree indicated the diminution of the column. No type, however, of base or pedestal, is found in trees; hence the ancient Doric is without base.' The other constituent elements of Grecian A. are accounted for by similar analogies. In like manner the mass and solidity of Egyptian buildings are derived from the rock-cut caves in which its early inhabitants dwelt, and the topes of the Buddhist races of India are supposed to be the natural sequence of the 'barrows' or tumuli of primitive man. But although such causes as these may have given the first impulse to the styles characteristic of the various races, their development must have been modified by all the complex influences which affect the progress and direction of the civilisation of any people. The leading characteristics of the various styles will be

noticed under their respective headings. See BYZANTINE, GOTHIC, GREEK, RENAISSANCE, ROMAN, &c.

Architrave (Gr. prefix, *archi*, chief; Lat. *trabs*, a beam), that part of the entablature which rests immediately on the columns. The name is also given to the outer moulding of the arches of doors and windows.

Archives. See RECORDS.

Archivolt (Gr. *archi*, chief, and Lat. *volvere*, to roll), the band of mouldings running round the voussoirs of an arch, and terminating on the impostes or capitals.

Archon, the chief magistrate at Athens, of whom the first was Medon, son of Codrus, the last king of Athens. The office was at first for life, and dynastic, *i.e.*, confined to one family; but in 752 B.C. it was limited to ten years; in 714 B.C. it was thrown open to the nobles; and to all citizens in 477 B.C. In 683 B.C. the office became annual, and the number of archons was increased to nine, the first of whom was called A. *Eponymos*, the year being registered in his name; the second, *Basileus*, managed religious affairs; the third, *Polemarchos*, was generalissimo; and the other six were styled *Thesmothetæ*, or legislators, though, strictly speaking, they did not make laws, but only declared and expounded them.

Archytas, of Tarentum, a distinguished philosopher, mathematician, soldier, and statesman, who flourished probably about 400 B.C., and was drowned on the Adriatic coast. So great was his integrity, that he was seven times the general of his city, though the office was usually held only for a year. He was victorious in all his campaigns, and his administration of civil affairs was of the greatest benefit to the community. In his philosophy he was a Pythagorean, and Plato and Aristotle are thought to have been both indebted to him. He invented the method of analytical geometry, solved the problem of the doubling of the cube, and applied mathematics to mechanics. Numerous fragments attributed to A. are given by Stobæus (see Orelli's ed. 1821), but their genuineness has not been satisfactorily established.

Arcidosæo, a town in the province of Grosseto, Central Italy, on an affluent of the Umbrone. Pop. of commune, 5859.

Arcis-sur-Aube, a town in the department of Aube, France, famous as the scene of a victory of the Austro-Russian allies over Napoleon, March 21, 1814. It is now an entrepôt for the iron of the Vosges, and has several cotton-factories. Pop. (1872) 2784.

Arcola, a village in the province of Verona, N. Italy, on the Adige, 15 miles E.S.E. of the town of Verona. It is remarkable for a battle in which Napoleon, after three days' hard fighting, defeated the Austrians under General Alvinczy, November 17, 1796.

Arçon, Jean Claude Eléonore d', a French engineer, was born at Pontarlier, 1733, and studied at the school of Mézières. He is chiefly noted for the invention of floating batteries, by means of which he hoped to capture Gibraltar from the British in 1782. The project, however, failed, and A. fell considerably in the opinion of his volatile countrymen, though Elliot, the defender of Gibraltar, did justice to the boldness and ingenuity of his design. In 1793 he distinguished himself during the war of sieges with Holland, and forced Breda to open its gates to him. A. died July 1, 1800. His chief work is *Considérations militaires et politiques sur les Fortifications* (1795).

Arcos de la Frontera, a town of Andalusia, Spain, overhangs the Guadalete, 32 miles N.E. of Cadiz. It has a romantic situation, with a splendid view W. towards the Ronda Mountains. It was called *Arcos*, a 'bow,' from its crescent shape, and *de la Frontera*, because it stood near the Moorish frontier. In the plains below A. a rare breed of horses was reared, and the A. barbs and their skillful riders are often mentioned in the national ballads. The chief industries are tanning, and rope and thread spinning. Pop. 11,270.

Arçoot, the capital of a district of the same name, stands on the river Palar, 68 miles W. of Madras. It contains the ruins of

the Nawaab's palace, military cantonments, and some mosques. Clive first won distinction as a soldier by the capture and subsequent defence of A. in 1751. Pop. 53,500.

Arcot, a district on the E. coast of the province of Madras, British India. It is divided into North A., with an area of 7526 sq. miles; and South A., with an area of 4765 sq. miles. Near the coast the country is low and productive, but inland it is hilly and full of jungle. As most of the rivers become empty in the dry seasons, thousands of tanks, some of which are of enormous size, are required for irrigation and domestic use. Pop. (1871) of North A., 2,007,667; of South A., 1,762,525.

Arctic and Antarctic Circles are imaginary lines drawn round the earth at a distance of $23\frac{1}{2}^{\circ}$ from the N. and S. poles respectively, and serving to mark those regions at which, at one period of the year, there is no night, and at another period no day. The word A. is from the Greek, and literally signifies 'near the Bear,' i.e., the great constellation in the northern sky; hence northern, its secondary meaning.

Arctic Ocean, the sea which surrounds the N. pole, and extends as far S. as the Arctic Circle. It is partly hemmed in by the northern shores of Europe, Asia, and America, leaving open the connection with the Atlantic on the N.W. of Europe, and with the Pacific through Behring's Straits. Despite the heroic daring and active enterprise of about three centuries, little is yet known of this great ocean. Beyond the 83d parallel there lies a circle nearly 2100 miles in diameter, being about equal to the area of Europe, which remains totally unexplored. The numerous polar expeditions of late years have resulted in conflicting accounts regarding the A. O.; but it would seem that at the most northerly point reached the fields of unbroken ice give way to a sea more or less covered with drifting floes. Parry, who reached lat. $82^{\circ} 45'$ in 1827, mentions heavy falls of rain as indicating the comparative mildness of temperature. It is now also beyond a doubt that there exists an almost constant current from the A. O. southwards; and it would seem to be established that Greenland is an island, or possibly a group of islands, which the glacier ice has covered and united. The German expedition of 1869-70 reached the 77th parallel, explored part of the E. coast of Greenland, and made many valuable scientific discoveries, notably that of the abundance of the musk-ox at the most northern point to which they penetrated. See NORTH-EAST PASSAGE, NORTH-WEST PASSAGE, and POLAR VOYAGES.

Arc'tium, a genus of Composite plant. See BURDOCK.

Arc'tomys. See MARMOT.

Arctostaphylos, a genus of plants of the order *Ericaceæ*. There are only two species which properly belong to the genus, and both are natives of Britain. The red bearberry (*A. uva-ursi*) is a small trailing evergreen shrub found in the northern parts of Europe, Siberia, and N. America. It ascends to 3000 feet in the Scottish mountains. The plant is astringent, and is occasionally used for tanning, as well as a valuable astringent in cases of excessive secretion in the human body. The black bearberry (*A. alpina*) has black berries about the size of the common sloe, which have a peculiar taste. The plant, which is the badge of the Clan Ross, has a trailing habit similar to the other species, and is found on some of the Scottish mountains.

Arcturus, or α Bootes, a star of the first magnitude, in the same direction, and about twice as far from the Pole-star, as the end tail-star of the Great Bear.

Ar'cus Senilis. This term is given to a blue or grey ring seen around the margin of the cornea of the eye in people of advanced or premature age. It is due to fatty degeneration of the substance of the cornea, and is usually regarded as significant of the presence of the same kind of degeneration in the coats of the blood-vessels and in the heart. At the same time, cases of fatty heart occur in which there is no A. S., and, on the other hand, A. S. may exist without fatty changes in the substance of the heart.

Ard, or **Aird**, a Celtic root, meaning 'high,' 'great,' which enters into the composition of many names of places in Scotland, Ireland, France, and other Celtic countries; e.g., Ardnamurchan, the Aird of Lewis, Ardrossan, Ardmure, Arran, Ardagh, Ardglass, Ardennes, the Ardes (or 'heights') in Auvergne, &c.

Ardes. See HERON.

Ardèche, a southern department of France, about 50 miles inland, formerly part of Languedoc. It is a wild hilly region, and abounds in extinct volcanic peaks, basaltic columns, vast caverns, and deep ravines. The Rhone bounds A. on the E., and along its banks the rich terraces produce good wine, olives, figs, and almonds. The Cevennes traverse the W., and in the N. terminate in the volcanic Mont-Mézène, 5972 feet high. The river A. is a branch of the Rhone, and has many affluents. The chief towns are Privas, Aubenas, and Bourg. The manufactures are silk, paper, leather, and iron. Area, 2133 sq. miles; pop. (1872) 380,277.

Ardee (*Ath-Fhirdia*, pronounced *Ahirdee*, 'Ferdia's Ford'; in old English writers, *Atherdee*), a town of Louth County, Ireland, on the Dee, 12 miles from its mouth, with some trade in agricultural products. It has two ancient castles. Pop. (1871) 2572. The name is derived, according to Irish tradition, from a Firbolg chief called Ferdia, who fell in battle here.

Ardennes (Celt. the 'Great Forest'), a department of France on the Belgian frontier, formerly part of the province of Champagne. The surface is generally hilly and sterile; the prevailing rock is limestone, and in the S.E. the muschelkalk is rich in iron ore; only at Mézières, in the S.W., is the vine grown. The N. of A. is watered by the Meuse, and the S. by the Aisne; both rivers have affluents, and the *Canal des A.* unites them. The chief towns are Mézières, Rethel, Rocroy, and Sedan. The manufactures are glass, woollens, marble, iron-ware, and pottery. Area, 2021 sq. miles; pop. (1872) 320,217. A. is part of the rugged slate plateau of the same name, which includes also parts of Belgium and Rhenish Prussia ('the forest of Ardennes'), a region of vast heaths, impenetrable marshes, and dense oak and beech forests. The bed of the Meuse here presents a sterile, savage appearance, overhung sometimes by cliffs 600 feet high.

Ardnamurchan Point (Gael. *Ard-na-mor-chinn*, the height of the great headland), a promontory of trap-rock in the N.W. of Argyshire, and the most westerly point of the British mainland. A lighthouse, visible 20 miles off, was built here in 1849.

Ardoch (Gael. 'high field'), a village in Perthshire, Scotland, 8 miles S.S.W. of Crieff, interesting for its Roman camp, the best preserved in Britain. The camp formed a rectangle, 500 feet by 430. Five ditches and six walls defended the N. and E. sides, while a morass lay on the S.E., and the precipitous banks of Knaig Water, 50 feet high, protected the W. side. The prætorium, a square with a side of 60 feet, occupied a position near the centre, and the sites of three of the gates can still be traced. A human skeleton was found in a stone coffin under a cairn a mile to the W. of the village, but this was probably a Caledonian and not a Roman work. The stones have been gradually carried off to construct buildings and fences.

Ardoye, a town in W. Flanders, Belgium, 17 miles S. of Bruges. Chief industry the bleaching of linen. Pop., including commune, 6478.

Ardrossan (Gael. 'high foreland'), a seaport and watering-place of Ayrshire, 32 miles S.W. of Glasgow by rail. Founded in 1806 by the 12th Earl of Eglinton, it has a town-hall, 5 churches, 2 banks, a large hotel and baths, 2 newspapers, and a harbour with a wet-dock of nearly 9 acres and a graving-dock. In 1879 there entered with cargoes 932 vessels of 193,555 tons, and cleared 3255 of 361,247. Coal and pig-iron are the chief exports; industries are shipbuilding (21 sailing vessels of 1261 tons during 1875-79), ironfounding, and the timber trade; and steamers ply to Ayr, Glasgow, Arran, and Belfast. Pop. (1871) 3845.

Are, the unit of French land measure, is equivalent to 100 sq. metres (see METRE), and therefore contains about 1076 English sq. feet. The décare contains 10 ares, and the hectare 100 ares—nearly 2½ English acres.

Area is a mathematical term signifying *quantity of surface*; or it may be defined as the number of square units contained by a given surface. The calculation of such is one of the most practical outcomes of geometry. The analytical expression for the area of any plane surface is the integral of the product of the ordinate and the increment of the abscissa, or $\int y dx$.

Areca, a genus of palm-trees. *A. Catechu* has a lofty stem, and is cultivated in parts of India for its seeds, which are contained in fruits of a fibrous texture about the size of a fowl's egg. The seeds are known as A-nuts and betel-nuts, and are much used in Eastern countries. They are cut into small pieces, chewed along with hot-lime and the leaves of the betel-pepper as a stimulant. See BETEL.



Areca Catechu (Betel-nut Palm).

Charcoal is made of the nuts, and used as a tooth-powder in Britain. A kind of Catechu (q. v.) is obtained by boiling the nuts. The cabbage palm of the W. Indies (*A. oleracea*) has a tall stem terminated by a large leafy bud, which is used as a vegetable; hence its name. A small species, *A. sapida*, occurs in New Zealand.

Arecibo, a town on the N. coast of Puerto Rico, in Spanish W. Indies, with a good trade. Pop. 11,187.

Areiopagus ('Hill of Mars'), a celebrated council of ancient Greece, so called from the hill of that name on which the council met. The hill lies to the W. of the Acropolis at Athens. The origin of the council is lost in antiquity. As early as the first Messenian War (B.C. 740) we find notice of its fame. Even then it is spoken of as old. Solon made important changes in it, modifying considerably its purely oligarchical constitution. It was now composed of the archons (see ARCHON) of the year. Besides exercising supreme authority in affairs of state, the rule of the council seems to have been eminently what we call 'paternal.' They enforced observance of hygienic law by prohibiting the overcrowding of rooms at social gatherings, and they even sent officers on such occasions into private houses to see that their rules were observed. Drunkenness, extravagance, and impiety were noted, offenders punished, and the deserving rewarded.

Pericles, however, dealt the A. a blow from which it never recovered. What was the precise nature of the decree which he succeeded in carrying (B.C. 458) we do not know. It is probable that the A. was deprived of its high political authority, but it long retained considerable moral influence over the community. Even this gradually dwindled away, until in the general moral corruption of Athens which followed its subjection to Macedonia an Areiopagite became a name of scorn. Still, as late as the time of St Paul we hear of it as having some religious authority, and we find it in existence so late as A.D. 380. The date of its extinction is not known.

Arene, that part of an amphitheatre in which the combats of gladiators and wild beasts took place. It was usually strewn with sand, hence its name. The A. was surrounded by a wall of sufficient height to protect the spectators, and—a feature worthy of imitation in our own places of public assembly—there were four main entrances. On the Continent, any open building of the nature of a theatre is called an A.

Arenaceous Rocks include all rocks composed largely or wholly of grains of quartz or flint. The recent deposits are interspersed with loose sand; but in the older deposits the sand is generally held together by various cements, silicious, calcareous, ferruginous, &c.

Arenaria (Sandwort), a genus of plants belonging to the order *Caryophyllaceæ*. The species are numerous, and are widely distributed. They are mostly small herbs found in sandy places, and are of no economical value.

Arendal, a thriving seaport on the bay of Christiania, in the S.E. of Norway, with considerable shipbuilding-works, distilleries, breweries, and tobacco-factories. It is picturesquely situated, the houses being partly built on rocky islets and on piles overhanging the water, on account of which the Norwegians call it 'Little Venice.' Many of the streets are merely bridges

connecting isolated clumps of houses. A. was for some time the residence of Louis Philippe after the French Revolution. Pop. 4456.

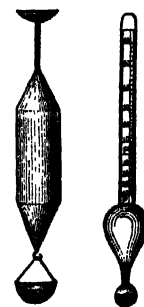
Aren'ga, a genus of palms. See GOMUTO.

Arenic'ola, a genus of Errant worms or Annelides, represented by the *A. piscatorum*, the familiar lob or lug worm of fishermen, so much used for bait; hence the specific name, *piscatorum* ('of fishermen'), of the worm. This worm possesses a massive, obtuse, rounded head, and a body of smaller calibre. In size they generally resemble large earth-worms. The branchiae, or gills, exist in the form of thirteen pairs of tufts placed along the sides of the body. No eyes or jaws exist. The lob-worm is the artificer of the little coils of sand so numerous on the seabeach after the tide has receded. These sand-coils are passed through the body as the animal burrows downwards in the sand.

Areolar Tissue is a variety of connective tissue found in the animal body, by means of which various organs and parts of organs are connected together. A. T. consists of very soft fibres of various degrees of coarseness. These are often so close together as to form laminae, which frequently cross and recross in all directions, leaving open spaces, or areolae, between them. A. T. is found underneath the skin, forming a bed in which lie numerous fat-cells, also covering the muscles, blood-vessels, and nerves, and also connecting the lobes and lobules of glands. It is the most widely-distributed tissue of the body, and it may be traced uninterruptedly from one part to another. For further details regarding it see CONNECTIVE TISSUE.

Areom'eter (Gr. *araios*, thin; *metron*, a measure) is an instrument for measuring the densities of liquids. Its principle may be stated simply thus: Any solid body sinks further in a light liquid than in a heavy one. The A. usually consists of a small glass bulb loaded at the bottom with mercury or small shot, so as to keep it upright, and provided with a graduated scale at the top, so as to mark the depth to which it sinks in the liquid. As the densities of the liquids change with the temperature, a thermometer is frequently placed alongside the graduated scale, and is sometimes so ingeniously adjusted as to give at once the required correction. The delicacy of such instruments depends to a great extent upon the thinness of the tube with respect to the bulb, so that it may be disregarded in the calculation.

Of all areometers, Gay-Lussac's is decidedly the most accurate, but is seldom used in practical measurements. In Nicholson's A. the specific gravities are obtained from the weight which is required to be added to the bulb, so as to sink it to a fixed mark upon the neck. This form evidently requires no graduated scale.



Areometers.

Arequi'pa, the third largest city in Peru, capital of a province of the same name, lies in the rich valley of Quilca, at the W. base of the Andes, 35 miles from the Pacific. It was founded in 1536 by order of Pizarro, and has now a considerable export trade, chiefly in wool and Peruvian bark. Its port, Islay, which has one of the best harbours in the republic, was partly destroyed by an earthquake in August 1868. A. is connected with its port by a railway. Pop. about 45,000.—The province of A. extends along the Pacific, and is generally sterile. Area, 26,700 sq. miles; pop. 180,000. About 14 miles E. of the city is the famous volcano of A., 19,704 feet above the sea.

Aretæ'us, a famous Greek physician, born in Cappadocia, of whose life nothing is known further than that he practised probably at the close of the 1st and beginning of the 2d c. A.D. He generally followed Hippocrates in his practice, but was not the slave of any system; and his descriptions of the symptoms, and his prescriptions for the treatment of disease, have been often endorsed by subsequent experience. His work on the causes, symptoms, and treatment of acute and chronic diseases, in eight books, written in very pure Ionic Greek, in imitation of Hippocrates, is not quite complete, some chapters being wanting, and minor *lacunæ* numerous. The first edition of the Greek text was published by Goupyl (Paris, 1554). A much finer one appeared at Oxford (Wigan, 1723); but the latest and best is that of

Ermerius (Grön. 1847). It has been translated into French, Italian, and German, and parts of it into English by J. Moffat (Lond. 1785), and by T. F. Reynolds (Lond. 1837).

Arethusa. See ALPHEIUS.

Aretino, Pietro, an Italian wit and poet, born at Arezzo, in Tuscany, in 1492, was the natural son of a gentleman, Luigi Bacci, and of a female of obscure origin named Tita. From the Latin *Aretinus* ('belonging to Aretium,' or Arretium, mod. Arezzo) comes the Italianised form Aretino. Throughout life A. was accomplished, licentious, and vagrant. Banished from Arezzo, he commenced a wandering life, and eventually found himself at Rome, fascinating people by his wit, daring, and general talent. He first won, then lost, the patronage of the Pope, through writing licentious verses, the notorious *Sonetti Lussuriosi*, sixteen in number, intended to accompany as many obscene engravings. He shone for a time at the court of Giovanni de' Medici, and of Francis I., at Milan (1524); passed to Venice, which he was wont to call an earthly paradise, and where he and his sisters led a life of scandalous pleasure. Yet this unsurpassable libertine occasionally affected the saint, and wrote works of piety which drew tears from devotees, and induced him to cherish hopes even of a cardinal's hat; but though Pope Julius III. flattered A., he did not venture to commit so flagrant an outrage on religion. A. died at Venice, 1556. His works comprise five comedies, abounding in humour; a tragedy; the *Sonetti Lussuriosi*, a French version of which is oddly named *Académie des Dames*; *Rime*, *Stanzas*, and *Capitoli*, mostly panegyric, or licentious, or satirical; an unfinished epic, *Due Canti di Marfisa*, and a considerable number of other pieces, some religious, but the greater part indecent. See Mazzuchelli *Vita di Pietro Aretino* (last ed. Milan, 1841).

Aretino, Spinello Spinelli, an early Italian painter—Vasari prefers him to Giotto—born at Arezzo in 1323, studied under Casentino, and lived sometimes at Florence and sometimes at Arezzo, where he died in 1415. Among his works are—(1) in Arezzo, an Annunciation, a Madonna presenting the infant Jesus with a rose, the Twelve Apostles, and other frescoes; (2) in Florence, frescoes in San Miniato from the life of St Benedict; (3) in Pisa, in the *Campo Santo*, some incidents in the lives of St Potitus and St Epiusius.

Arezzo (anc. *Arretium*), capital of the Italian province of the same name (1276 sq. miles; pop. 219,559), in the valley of, and 4 miles distant from, the Arno, and 38 miles by rail E.S.E. of Florence. Its chief buildings are its churches, and its cathedral contains a magnificent marble altar by Pisano. It is one of the oldest towns in Tuscany—the ancient *Arretium* having been one of the twelve chief cities of Etruria—and was famous for its pottery—bright red ware, with objects in relief—and its works in bronze. No important industries are now carried on. Pop. (1872) 38,907. A. is the birthplace of Mæcenas, the Emperor Augustus, Petrarca, Pietro Aretino, Spinello Aretino, Vasari, and many other illustrious men.

Argali Sheep (*Ovis Annon*). This, the 'wild sheep' of naturalists, inhabiting Kamchatka, Siberia, the Himalayas, Barbary, Corsica, and Greece, is by some naturalists considered the original progenitor of our domestic breeds. It is agile and active, and inhabits mountainous districts. Its flesh is savoury. The food consists of grass and leaves of young trees. The milk is used as food. The horns are about 4 feet long, and 14 inches in circumference at their base.

Argand, Aimé, physician and chemist, celebrated as the inventor of the A. lamp, was born at Geneva about the year 1755. At London, in 1782, he made his first lamp, which differed from other lamps at that period in having a circular wick and a glass chimney, by which means a greater supply of air was obtained, and a more perfect draught generated, thus effecting a more complete combustion. As the priority of the invention was disputed by a Parisian of the name of Langé, the patent was taken out in the name of both; but the controversy in which he had been involved so preyed on his mind that he became subject to deep melancholy, and died in great misery in his native town, October 24, 1803.

Argania, a genus of plants of the order *Sapotacea*. The argan-tree of Morocco, *A. sideroxylo*, yields an egg-shaped

fruit, used for feeding cattle. From the seeds an oil is extracted of great value. Its wood sinks in water, and is very hard.

Argaum, a village of Berar, Central India, 40 miles S.W. of Ellichpore, where Major Wellesley (afterwards Duke of Wellington) gained a signal victory over the Mahrattas, November 28, 1803.

Argel, or **Arghel**, the Syrian name for *Solenostemma A.*, a plant of Arabia and Northern Africa, belonging to the order *Asclepiadaceæ*, the leaves of which are used for the adulteration of Egyptian senna.

Argelander, Friedrich Wilhelm August, an eminent German astronomer, born at Memel, March 22, 1799. In 1823 he was appointed astronomer at the observatory of Abo in Finland. The result of his observations on the fixed stars, both here and subsequently at Helsingfors, was the publication of a catalogue of 560 of these stars having proper motions. After removing to Bonn in 1837, he published *Uranometria Nova* (1843), and *Astronomical Observations* (1846, *et seq.*). A. was subsequently engaged in observing the changes of light in variable stars. He died February 17, 1875, at Bonn. His latest observations were of Coggia's bright comet of 1874.

Argemone, a genus of plants belonging to the order *Papaveracea*. *A. Mexicana*, the Mexican poppy, has become widely distributed over the warmer regions of the globe. Its seeds, like others of the Poppy family, have narcotic and purgative qualities. An oil is obtained from them. The juice of the plant, which is yellow, has been successfully used in diseases of the eye.



Argemone grandiflora.

Argens, Jean Baptiste de Boyer, Marquis d', has a place in history as a friend and associate of Frederick the Great. He was born at Aix, in Provence, June 24, 1704, entered the army at fifteen, but was from the first (according to Carlyle) an 'extremely dissolute creature.' After being disinherited by his father, he took to literature, and published *Lettres Juives*, *Lettres Chinoises*, *Lettres Cabalistiques*, and *La Philosophie de Bon Sens*, 'frothy books' of an 'anti-Jesuit turn,' but, like himself, full of good-humour and a 'certain light, sputtery wit.' They attracted the notice of Frederick, who invited the author to Prussia, appointed him chamberlain, and a director of the Art Academy at Berlin. He was more loyal to Frederick than any of the foreigners who summered in his favour, and but for his amorous peccadilloes, might be considered a very honest gentleman. After 'many temporary marriages with actresses,' he wedded one 'in permanence, Mamsell Cochois, a patient, kind being,' and settled down into domestic regularity. A. died on a visit to his native Provence, 26th December 1771. Frederick's letters to his widow show how truly he loved his light-hearted friend of thirty years' standing. A collection of his works, in 24 vols., appeared in 1768. See Carlyle's *History of Frederick the Great* (*passim*).

Argensola, Lupercio and **Bartolomeo**, poets of Spain, born respectively in 1565 and 1566, studied at Huesca, and afterwards removed to Madrid, where they were taken under the patronage of Maria of Austria, who appointed the elder her private secretary, and Bartolomeo her chaplain. Lupercio was subsequently appointed Historiographer of Aragon to Philip III., and afterwards Secretary of State to the Viceroy of Naples, where he died 1613. Bartolomeo succeeded his brother as Historiographer of Aragon, and, having earned a fame, chiefly by his *Conquista de las Islas Molucas* (1609) that ranks him among the Spanish classics, died 1631. Besides their poems, *Rimas* (Saragossa, 1634), examples of cultivation rather than of originality, the combined work of the brothers may be seen in the continuation of Zurita's *Annals of Aragon* (1630).

Argenson, Marc Pierre, Comte d', a French statesman, born 1696. The family to which he belonged has held property in Touraine for many generations. Nor was he its first distinguished member. History takes note of **René de Voyer, Comte d'A.**, a diplomatist and statesman in the days of Richelieu and Mazarin; of **Maro René d'A.**, President of Finance in the time of Law, and a resolute but unsuccessful opponent of that wild speculator; and of his two sons, **René Louis, Marquis d'A.**, a vigorous and bold politician and author, and **Marc Pierre**, the subject of our notice, who became lieutenant of police in 1720, and Secretary of State to the Minister of War in 1742. On the death of Fleury, the year after, the whole burden of the department fell on him, just when France was completely exhausted by repeated disaster. He soon changed the face of affairs, and the victory of Fontenoy and the leaguer of Maestricht led to the glorious but unprofitable treaty of Aix-la-Chapelle in 1748. He now repaired the fortresses, inspired the army with fresh spirit, and established the *École Militaire* in 1751. As a generous and intelligent patron of literature, the *Encyclopédie* was dedicated to him by Diderot and D'Alembert, and he supplied Voltaire, whose schoolfellow he had been, with materials for his *Sicèle de Louis XIV.* Intrigues set on foot by Madame Pompadour caused him to be exiled; but after her death he returned to Paris, and died there, August 22, 1764. His grandson, **Maro René de Voyer d'A.** (born 1771, died 1842), was notable in his later years for his devotion to republican ideas.

Argent (Fr. *argent*, Lat. *argentum*, silver), the term always used in heraldry for silver. In engraving shields, it is left white.

Argenta, a town in the province of Ferrara, Central Italy, on the Reno. Pop. of commune, 15,926.

Argenteus Oodex. See ULFILAS.

Argentine Republic (Sp. *Confederacion Argentina*), formerly called the Confederation of the Rio de la Plata, a country of S. America, in lat. 22° 30' to 41° S., and long. 54° to 70° 30' W. It is bounded N. by Bolivia; E. by Paraguay, Brazil, Uruguay, and the Atlantic; S. by Patagonia; and W. by the Andes of Chili. In length it is about 1740 miles, in breadth 1000 miles. The following table shows its divisions, area, and population, according to the census of 1869:—

Provinces.	Departments.	Area in Sq. Miles.	Population.
1. Buenos Ayres . . .	51	83,615	495,107
2. Santa Fé . . .	4	25,087	89,117
3. Entre Rios . . .	10	29,955	134,271
4. Corrientes . . .	17	45,454	129,023
5. Cordova . . .	14	58,997	215,508
6. San-Luis . . .	8	24,151	53,294
7. Santiago . . .	8	38,799	132,898
8. Mendoza . . .	8	30,699	65,413
9. San-Juan . . .	4	18,772	60,319
10. Rioja . . .	7	31,103	48,746
11. Catamarca . . .	8	35,780	79,962
12. Tucuman . . .	9	63,386	108,953
13. Salta . . .	16	93,461	88,933
14. Jujuy . . .	9	33,527	40,379
Total . . .	173	542,786	1,741,923

Besides the above provinces there are some unorganised territories, such as *El Gran Chaco*, whose area and population are uncertain. Great numbers of immigrants, chiefly Italians, have been increasing the population of late years. In 1871 there were 45,390 immigrants.

With the exception of the N.W. corner, which contains some of the loftiest outlying portions of the Andes, and the province of Entre Rios, where there are some elevated ranges, the country is very level, consisting chiefly of immense grassy plains. In the N. is the desert of *El Gran Chaco*.

The republic is well watered by numerous rivers, among the principal of which are the Parana, with its great tributaries from the N.W., the Pilcomayo, the Vermejo, and the Salado; the Colorado, and the Negro, all debouching into the Atlantic. Lakes, both fresh and (in the W.) salt, are abundant. The climate and productions vary from tropical in the N., to temperate in the S. Agriculture is little prosecuted, but millions

of cattle and large droves of horses and mules are reared on the vast pasturage of the Pampas (q. v.). Among wild animals mention may be made of the tapir, hippopotamus, armadillo, llama, and vicuna. Mining has not been vigorously engaged in. There are silver mines at San-Juan, and sulphur, alum, iron, have been found; but the name given to the estuary of the Parana, viz., *Rio de la Plata* ('river of silver'), though it is perpetuated in the new name of the Confederation (*Argentine Republic*), merely represents the unfulfilled expectation of the early explorers.

The estuary of the La Plata was discovered by Don Juan Diaz da Solis in 1515, and Buenos Ayres was founded twenty years afterwards by an expedition sent out by the Emperor Charles V. Cities were gradually founded by the Spaniards all over the country, which, however, remained under the Peruvian viceroyalty till 1775, when the Plate provinces were formed into a separate government, the viceroyalty of Buenos Ayres. In 1808 the colonists deposed the Spanish viceroy, and, after a struggle, succeeded in asserting their independence of Spain. Between 1810 and 1835 the A. R. thus formed had upwards of thirty changes of government. From 1835 to 1851, General Rosas ruled with dictatorial sway. In 1853 the present constitution, which provides for an elective president, a senate, and a house of deputies, was established. A., along with Brazil, carried on a war with Paraguay from 1865 to 1870. Buenos Ayres (q. v.), as the seat of the principal city, and the outlet of all the trade of the republic, has always exercised a preponderating influence in the formation and execution of the intrigues, conspiracies, and insurrections which constitute the political history of the confederation.

Arges, a genus of fishes belonging to the family *Siluride*. These forms are of small size, and were described by Humboldt and other travellers as being ejected from the craters of S. American volcanoes, in showers of muddy water. The most familiar species is the *A. cyclofum*. Their origin, or the conditions under which they exist, form unsolved problems of the naturalist; but as water in the form of steam is now known to be the cause of volcanic eruptions, these fishes are doubtless contained in this water, which gains access to the volcanic depths.

Argile Plastique, a series of beds at the base of the Tertiary formations occurring in France, and consisting of sandy deposits, interspersed with beds of clay, and corresponding to the lower Eocene c. the English geologists. They rest on a conglomerate of angular chalk-flints.

Argilla'ceous Rocks are composed, either entirely or in part, of clay or silicate of alumina, and include the plastic clays, such as *kaolin* and *common clay*; the laminated clays, such as *shale*; and the hard metamorphic clays, such as *clay-slate*. These last form extensive deposits in the *Azoic* strata, but are also found in the Palæozoic formations, having been produced by the action of heat on the shales of these strata.

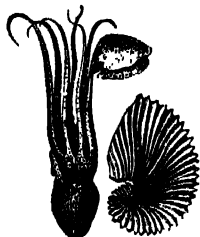
Argol, or **Argal**, is the name given to the impure bitartrate of potash, $\text{KHC}_4\text{H}_4\text{O}_6$, which is deposited from wine after it has been kept for some time in cask. The bitartrate of potash is not formed during the keeping of the wine, but exists in the grape-juice in a state of solution before fermentation; owing, however, to its insolubility in dilute alcohol, it becomes deposited after this is produced. A. is the chief and only important source of tartaric acid, the preparation of which from this substance will be found in article TARTARIC ACID. Pure bitartrate of potash, or *cream of tartar*, as it is called, is readily prepared from A. by dissolving it in boiling water, decolorising the solution with animal charcoal, and allowing to crystallise.

Of the two kinds of A. found in commerce, *white A.* is deposited from white wine, and is of a pale pink colour; whilst *red A.* is obtained from red wine, and is dark red.

Argolis, the peninsula lying between the gulfs of Nauplia and Ægina, in the N.E. of the Morea, was anciently a state of the Peloponnesus, and now forms, along with Corinth, a nome of modern Greece. The plain of Argos, 12 miles long and 5 broad, once famous for its noble breed of horses, is now largely occupied by marshes. The only river flowing through A. during the whole year is the Kephalaria (Erasinus); the Baniza (Inachus), which falls into the Argolic Gulf, is often dry in summer; and the others are mere mountain torrents. Mountains, the highest summits of which rise to between 5000 and 6000 feet, shut in

the plain on three sides, while on the fourth it is open to the sea. The plain produces corn, cotton, vines, and rice. Argos was said to be the oldest city in Greece, and was fabled to have been built by Inachus, 1800 B.C. It was the head of a league of Doric cities, and, together with its urban territory, contained, in the height of its prosperity, 100,000 inhabitants. According to the Greek myth, it was the birthplace of Hercules, who performed in the neighbourhood two of his twelve labours—the destruction of the Lernean hydra and the Nemean lion. Agamemnon was ruler of Argos. The inhabitants were famed for their piety to the gods, and were skilled in statuary and in music, but did not excel in literature. The modern Argos contains 10,000 inhabitants, and the nome 127,820.

Argonaut, a name given to the genus *Argonauta*, one of the Dibranchiate or Two-gilled Cuttle-fishes (q. v.) (*Cephalopoda*), popularly known as the *Paper Nautilus*, or 'Paper Sailor.' It belongs to the *Octopoda*, or group of eight-armed cuttle-fishes.



Argonaut.

Two of the eight arms are greatly expanded, and secrete and protect the shell, which is single-chambered, and possessed by the females only. The male A. is a small shell-less form, averaging an inch in length; and the third left arm of the male is developed to form a *Hectocotylus* (q. v.) for reproductive purposes. This is the animal so celebrated in poetry, and which formerly used to be regarded as sailing on the surface of the sea; using its two expanded arms as sails, and the other arms as oars—a statement purely fictitious and erroneous. The expanded arms are always

clasped around the shell, and the creature can move only after the fashion of other Cuttle-fishes (q. v.).

Argonauts ('sailors of the *Argo*'), the name of certain Greek heroes, who, according to a beautiful legend, set out in their ship *Argo*, under Jason, to fetch the golden fleece a generation before the Trojan war. The author of the *Odyssey* knew the story; Pindar and others give versions of it; but the first consistent and connected narrative is that of Apollodorus, the outlines of which are these: Jason, commissioned by his uncle Pelias of Iolcus to fetch from Colchis the golden fleece, which was guarded by a sleepless dragon, commanded Argus, the son of Phrixus, to build a ship of fifty oars, which he manned with fifty of the choicest heroes in Greece, whose names are given differently in different lists, and sailed from Iolcus. They remained two years at Lemnos, their first landing-place, where Hypsipyle, wife of Thoas, bore Jason two sons. Next they sailed to the Doliones, whose king, Clizycus, Jason accidentally killed, and proceeding to Mysia, they left there Hercules and Polyphemus. In the country of the Bebryces, Pollux killed King Amycus with the boxing-gloves. In Thrace the A. consulted the blind seer Phineus, who gave them his counsel on condition of their delivering him from the Harpies, which was done by Zetes and Calais. With the aid of Juno they steered their vessel through the opening and closing Symplegades, losing only some of its stern ornaments, as had been prefigured to them by the fortune of a dove let loose by the advice of Phineus. After further adventures they reached the mouth of the Phasis, in Colchis. The king, Æetes, promised Jason the golden fleece on the condition that he should yoke to a plough two fire-breathing, brazen-hoofed oxen, and sow the dragon's teeth which Cadmus had left at Thebes. Medea, daughter of the king, by her magic power enabled Jason to accomplish this and other perilous exploits. Seizing the golden fleece, Jason embarked by night with Medea and her brother Absyrtus. Æetes pursuing them, Medea cut up her brother into fragments, which she cast into the sea, and she and her lover escaped while her father was gathering them up. The mast, formed of one of the vocal oaks of Dodona, now warned them to sail to Ausonia, and get purified by Circe for the murder of Absyrtus. Thus they did. As they sailed past the Sirens, they were preserved from their charms by the song of Orpheus, and arrived at Corcyra, the island of Alcinoüs. Leaving Corcyra, they encountered a storm, from which they were saved by the agency of Apollo. Touching at Crete, they sailed thence to Ægina, and, after a four months' voyage, arrived safely at Iolcus. At the Isthmus of Corinth Jason dedicated the *Argo* to Neptune. The story of the A.

has been differently interpreted; but it probably refers to a voyage of discovery to the coasts of the Euxine by eager spirits among the wealthy Minyans of Iolcus, in quest of new commercial relations.

Argos. See ARGOLIS.

Argos'toli, the capital of Cephalonia, the largest of the Ionian Islands, lies on the S.W. coast, and has a good harbour. Pop. about 5500.

Arguella's, Agustin, a liberal Spanish statesman, was born at Ribadesella, in the Asturias, in 1775, and studied law at Oviedo. When the War of Independence broke out in 1808, he began an agitation in Cadiz for a regency and free constitution. In 1812 he was made a member of the Cortes, where for his fiery eloquence he was soon known as the Spanish Cicero, and surnamed *El Divino*. Ferdinand VII., on his return, arrested A. (1814), who, however, by his subtle defence, evaded conviction on five successive trials. The monarch himself finally sentenced him to ten years at the galleys of Ceuta. The revolution of 1820 again set him free, and he became Minister of the Interior for a short period. On the restoration of Ferdinand in 1823 he fled to England, where he resided till 1832. After his return he was repeatedly made President of the Chamber of Deputies, was for some time guardian to the young Queen Isabella, and, next to Espartero, was the most trusted of the Spanish patriots. In discussing the law regarding the sale of Church property (1841), he strongly opposed all concordats with the Pope. A. was a moderate, but staunch and consistent liberal, who loved his country, and distrusted the projects of the republicans. He died at Madrid, March 23, 1844.

Argument, a reason advanced to induce belief, an abstract of the subject-matter of a writing, and, in logic, the premise on which a conclusion rests. Logicians distinguish several kinds of A., of which the best known, though not the best, is the *Argumentum ad hominem*, which is simply an unfair attempt to prove a position by appealing to a man's known prejudices or admissions. Another favourite A. with those who are in a position to effectively use it, such as military tyrants and enraged mobs, is the *Argumentum a baculo* ('from the cudgel'), or 'physical-force A.,' which, though rudely expressed, is difficult to answer.

Argus, according to Apollodorus, the son of Zeus and Niobe, was the third king of Argos, which, Hyginus says, received its name from him. — A., surnamed *Panoptes* (the 'all-seeing') because he had 100 eyes, some of which were always awake, a mythic personage whose origin is variously given. After several heroic exploits in the Peloponnesus, Juno set him to watch Io, but Mercury, after lulling him to sleep with his lute, cut off his head. Juno transferred his eyes to the tail of her favourite, the peacock.—A., the son of Phrixus, and builder of the *Argo*. See ARGONAUTS.

Argus Pheasant (*Argus giganteus*), a prominent member of the genus *Argus*, included in the sub-family *Phasianina* of the Rasorial or Gallinaceous birds. This bird inhabits the Eastern Archipelago. The male measures about 5 or 6 feet from the bill to the tip of the tail, which consists nearly wholly of two elongated central feathers. The body-plumage is of a brown colour. The secondary quills of the wings are very long, and are each marked by ocellated or eye-like spots, from the presence of which the name A. has been derived. These long secondary plumes are said to impede the flight, but to assist the bird in running. The feathers of the female are much less brilliant, and are not so elongated as those of the male.

Argyle's Campbells of, a family of whom Scotland has some reason to be proud. Its origin reaches far back into the middle ages. Eight centuries ago, Gillespie Campbell acquired, by marriage with an heiress, the lands of Lochow, in Argyshire. From him descended Sir Colin Campbell of Lochow, who obtained the surname of 'More' or 'Great' on account of his deeds in war. He was made a knight by Alexander III. of Scotland. From him descended Sir Duncan Campbell, who assumed the designation of 'A.' He was summoned to Parliament in 1445 by James II., under the title of 'Lord Campbell.' This Lord Campbell married Lady Marjory Stewart, daughter of the Regent Duke of Albany.

He was succeeded by his grandson Colin, created Earl of Argyle in 1457. Archibald, the second earl, was killed at Flodden in 1513. Archibald, the eighth earl (see ARGYLE, A. C., MARQUIS OF), was created a marquis on 15th November 1641.

Argyle', Archibald Campbell, first Marquis of, an eminent character in the history of Scotland. He was born in 1598, and succeeded his father as Earl of Argyle in 1638. An honest and fearless man, on the formation of the National Covenant, he gave his opinion without reserve to the king and government, by whom he was consulted. In 1638 he took the side of the Covenanters, of whom he at once became the leader. Notwithstanding, when Charles I. came to Scotland in 1641, he showed favour to A., creating him a marquis. In the war which followed, the Royalists under the Marquis of Huntly were defeated by A.; but the brilliant victories of Montrose ultimately drove him from the field. During the negotiations between Charles and his parliament, A. endeavoured to mediate, but unsuccessfully. He opposed Cromwell's invasion of Scotland, and to the last remained loyal to the king, Charles II., on whose head he had put the crown at Scone, 1st January 1651. Ultimately he made terms with the Protector. On the Restoration, he was impeached for high treason, on the ground of having made terms with Cromwell. He was tried before the Scotch Parliament in February 1661, and being found guilty, was executed at Edinburgh on the following 27th May. There are few nobler characters in Scotch history than that of A.

His son, **Archibald**, ninth Earl of A., fought at Dunbar and Worcester on the side of the king, but was no less a lover of constitutional freedom than his father; and when the policy of James VII. excited the rebellion of Monmouth in the S.W. of England, A. sought to stir Scotland also, but was taken prisoner, and executed, June 30, 1685.

Argyle', John Campbell, Duke of, was born Oct. 10, 1678. He served with distinction under the Duke of Marlborough, of whose political party he was originally an adherent. On the fall of the Whigs in 1710, he was nevertheless appointed by their successors to command the British army in Spain. The dexterity with which A. contrived to steer through the political turmoils of his time has laid him open to the charge of laxity of political principle; yet, practically, he rendered real services to his country. The union between England and Scotland was largely owing to his influence and energy; and during the troubled times which followed the death of Anne, his prompt and wise measures were of the utmost service to the State. In recognition of this, he was in 1718 made Duke of Greenwich, in the peerage of England. His defence of Edinburgh before Parliament, after the Porteous mob, in 1737, showed a patriotism which secured him unbounded popularity in Scotland. He died in 1743. Of him Pope has written—

'Argyle, the State's whole thunder born to wield,
And shake alike the senate and the field.'

His good qualities are seen at their best in Scott's *Heart of Midlothian*.

Argyle', George John Douglas Campbell, eighth Duke of, was born April 30, 1823, and succeeded his father in 1847. The great Presbyterian struggle in Scotland, which, slumbering for centuries, ended in the disruption of the Scottish Church in 1843, engaged his earnest attention while yet a minor. On taking his seat in the House of Lords, he quickly showed a capacity for statesmanship; and on the formation of Lord Aberdeen's Ministry in 1853, he was made Lord Privy Seal. In 1855 he was made Postmaster-General, and on the formation of Mr Gladstone's Cabinet in 1868, Secretary of State for India. In 1854 he was elected Lord Rector of Glasgow University, and in 1861 President of the Royal Society of Edinburgh. In 1844 he married Lady Elizabeth Georgiana Gower, eldest daughter of the Duke of Sutherland. By her he has a numerous family, the eldest of whom, the Marquis of Lorne, married in 1871 H.R.H. the Princess Louise. He is the author of one or two able works, of which the most popular is the *Reign of Law* (London, 1867).

Argyle'shire (*Airer-Gadhil*, pronounced *Arrer-Gale*, land of the Gael, a memorial of the Gaelic or Irish colonisations) is a maritime county in the W. of Scotland, bounded N. by Inverness-shire, W. and S. by the Atlantic, and E. by Perthshire, Dumbarton, Loch Long, and Firth of Clyde. It includes upwards of forty

islands, the chief of which are Mull, Islay, Jura, Tiree, Coll, Rum, Lismore, and Colonsay. Its coast-line is so much indented that it exceeds 660 miles in extent, though the county is not over 115 miles long and 60 broad. Area, 3255 sq. miles; pop. (1871) 75,679, showing a decrease of 13,619 since 1851, chiefly caused by emigration. A. is famed for its romantic scenery, abounding in lofty mountains, rugged glens, wild promontories, and extensive lochs or arms of the sea. The principal peaks are Bedan-ambran, 3760 feet; Ben Cruachan, 3668; Buachael Etive, 3341; Ben Jura, 3319; and Ben More, 3174. The chief rivers are the Urchay and the Awe. By far the largest inland loch is Loch Awe (q. v.), one of the finest in Scotland; the sea-bays, Lochs Moidart, Sunart, Linnhe, Eil, Leven, Fyne, and Long. In this wild district the prevailing rocks are mica-slate, trap, quartz, and granite. Excellent roofing-slates are quarried at Easdale and Ballachulish; the mineral *Strontianite* was first discovered at Strontian; and lead and copper mines occur in Coll and Islay. A. rears more sheep than any other Scotch county, and is only behind Aberdeen, Ayr, and Perth in the number of its cattle. In 1872 there were 54,967 acres of permanent pasture, 24,246 of corn, and 12,305 of green crops. The chief towns are Inverary (the county town), Campbellton, and Oban, which unite with Ayr and Irvine in sending one member to Parliament; the county returns one also. There still exists much poverty and ignorance amongst the peasantry of A.; but there is no lack of vigorous character in A. men, who have supplied Glasgow, and other centres of industry, with not a few of their foremost citizens. The only considerable manufacture is whisky, Islay and Carri-belton being famous wherever that liquor is consumed. The chief antiquities are the ruins of Iona and Oronsay. Cantire, in former times, belonged to the powerful Lords of the Isles, and has many very interesting ecclesiastical remains. A large portion of A. is the property of the Campbell family, represented by the Duke of Argyle as its head, and also by the Marquis of Breadalbane.

Aria (Ital. 'air'), in music, is a word generally restricted to the more elaborate and extended airs in an opera, cantata, or other such composition.

Aria'ne, daughter of Minos of Crete and Pasiphaë, fell in love with Theseus, who had come from Athens with the tribute for the Minotaur. She gave him a clew given to her by Iheplæstus, by which to guide himself out of the labyrinth into which he had penetrated to slay the monster. Theseus having promised to marry her, she fled with him to Naxos, where Diana slew her. Another legend represents Bacchus as finding her in Naxos on his return from India, and marrying her. On her death he placed her nuptial crown among the stars.

Arial'dus, a deacon of Milan in the 11th c., who strongly condemned simony, and the practice common among the priests of the time of keeping concubines. Popes Stephen X., Nicholas II., and Alexander II. lent him their countenance; but emissaries of the Archbishop of Milan, who by his agency had been excommunicated, murdered him in an island in Lake Maggiore, whither he had fled from the violence of his enemies in Milan, and threw his mangled remains into the lake, June 28, 1066. The Bollandists register him among the saints of June.

Aria'na (mod. *Iran*), the name given by Strabo to an extensive region in Asia, corresponding pretty closely to the area occupied by the existing states of Persia, Afghanistan, and Beloochistan. It has originated the modern name 'Aryan,' which, as an ethnological and philological term, has almost entirely superseded 'Indo-European' and 'Indo-Germanic.' See ARYAN.

Aria'no, an episcopal city in the province of Avellino, S. Italy, in a pass of the Apennines, 2800 feet above the sea, and 50 miles N.E. of Naples. Earthenware is manufactured, and wine and butter are exported. A. has a noble cathedral. It has suffered much from earthquakes. Pop. 12,588.

A'rians. See ARIUS.

Arias Monta'nus, Benedict'us, a famous Catholic divine and Orientalist, born in 1527, in the village of Frexenal de la Sierra, in Estremadura, at an early age acquired a competent knowledge of Arabic, Syriac, and Chaldean, and subsequently

mastered several modern languages. After accompanying the Bishop of Segovia to the Council of Trent, he resolved to dedicate his life to literature, and withdrew to the mountains (hence his name 'Montanus') of Andalusia; but at the request of Philip II. he left his hermitage of Aracena, and repaired to Antwerp, to superintend the publication of Christopher Plantin's *Polyglot Bible*, which appeared in 1572. For this he received a pension of 2000 ducats from the king. The Jesuits caused him much annoyance by questioning his orthodoxy. Though he devoted himself mainly to Jewish antiquities and biblical lore, he was the author of several works in the department of general literature. He died at Seville in 1598.

Arica, a seaport in the S. of Peru, with an excellent roadstead, 190 miles S.E. of Arequipa. It forms an outlet also for the products of Bolivia, and exports silver, copper, wool, alpaca, and guano. In 1872, 222 vessels of 259,824 tons entered, and 221 vessels of 257,024 tons cleared, the port. The climate is unhealthy, and A. is frequently visited by earthquakes, the last and most destructive of which occurred in August 1868. It was once a flourishing and populous town, but has lost much of its importance, and is now merely the port of Tacna (q. v.), a large town about 30 miles inland.

Arichat. See CAPE BRETON.

Ariège, a department of France, lies along the N. base of the Pyrenees. It is extremely mountainous, the highest peaks being Montcalm (10,513 feet), Estats (10,611), and Serrère (9592). The manufactures are linen, woollens, and pottery; there are also iron mines and marble quarries. Chief towns, Foix, Pamiers, St Giron. Area, 1847 sq. miles; pop. (1872) 246,298. The river A. is a branch of the Garonne.

Aries, the Ram, the first of the signs of the zodiac, begins at the point where the ecliptic cuts the equator at the vernal equinox. It originally coincided with the constellation A.; but now, owing to the precession of the equinoxes, the sign A. is in the constellation Pisces, and all the other zodiac signs are altered to the same extent. See PRECESSION.

Aril, a peculiar body which surrounds the seeds of some plants. It forms the *mace* in Nutmeg (q. v.), and the orange-coloured covering of the seeds of the spindle-tree.

Arión, of Methymna, Lesbos, a famous lute-player, and inventor of the dithyramb, flourished about B.C. 700. According to a story which first appears in Herodotus, he was returning to Corinth from Tarentum with much treasure, when the mariners conspired to kill him and seize his riches. Warned by Apollo, he first, with the consent of the sailors, played on his lute, and then cast himself into the sea, where a dolphin receiving him on its back, carried him to Tænarus, whence he went to Corinth. The sailors told Periander of Corinth that A. was dead; but being confronted with him, they owned their guilt, and were put to death. The only remains of A.'s verse that have come down to us—and even these are doubtful—are a hymn in honour of Neptune, and an inscription preserved by Ælian, which are given in Brunck's *Analecta*.

Arios'to, Lodovico, author of the famous romantic poem *Orlando Furioso*, born at Reggio (Modena), 8th September 1474. His father was a military officer in the employment of Ercole, first Duke of Ferrara, and Cardinal Ippolito d'Este, younger son of this duke, having been favourably impressed by a collection of odes written by A., received the young poet into his household as gentleman, and employed him on various missions and other important affairs. Amid these employments, and the distractions of the court, *Orlando Furioso*, a poem descriptive of the marvellous adventures of paynims and Christian knights of the age of Charlemagne, and upon which the author spent ten years, was composed. It was first published at Ferrara, April 1516, in forty, and afterwards in forty-six, cantos. From the service of Cardinal Ippolito, A. passed into the service of his brother Alfonso, Duke of Ferrara. In 1522 the poet was appointed governor of Garfagnana, a wild district in the Apennines infested with bandits. Here A. resided nearly three years, during which time his wise administration of affairs, to which his reputation as a poet considerably contributed, resulted in the suppression of the more criminal forms of lawlessness. He returned in 1524 to Ferrara;

and, ostensibly in the service of the duke, but free to follow his literary employments, he continued to reside there, wrote comedies, and superintended their public performance. He died June 6, 1533. Italy is justly proud of A., who preceded and inspired the still greater Englishman, Spenser. The *Faery Queen* is a work of higher genius and nobler motive than the brilliant romance of the Italian poet, yet, but for the latter, it might never have been written. The *Orlando Furioso* continues to charm its author's countrymen, and has been repeatedly reprinted in the present century. The best editions are those of Panizzi (Lond. 1834); Gioberti (Flor. 1846, 3d ed. 1854); Lloyd (Trieste, 1857-59). It has also been translated into many European languages. A.'s English translators are Sir John Harrington (Lond. 1607), John Hoole (Lond. 1785), and, the most elegant of all, Wm. Stewart Rose (Lond. 1823-31).

Aripvístus, a German chief, entered Gaul on the invitation of the Averni and Sequani, who wished his aid against the Ædui. The Germans crossed the Rhine in vast numbers, and the allied forces subdued the Ædui. A., however, seized a third part of the Sequanian territory as his reward, and then made further demands. The Gallic tribes, in their despair, invoked the aid of Cæsar; and in a great battle (B.C. 58), from which A. escaped by flight, the Romans scattered the German host. The name of A. is conjectured to be Latinised from *Hær*, an army, and *Fürst*, a prince.

Aris'pé, a town of Mexico, state of Sonora, in the extreme N.W. of the country, is situated on the river Sonora, near the Sierra Madre. The neighbourhood is rich in the precious metals, and also produces considerable wine, grain, and cattle. Pop. 8000.

Arista and **Aristate**. See AWN.

Aristæus, according to the Greek myth, was a son of Apollo by Cyrene, the granddaughter of Peneius. He was born in that district of Libya named Cyrenaica, after his mother, and was taught the arts of healing and prophecy by Cheiron and the Muses in Boeotia, where he is said by some to have married Autonoe, daughter of Cadmus, by whom he had several sons, notably Actæon (q. v.). After delivering the inhabitants of Ceos from a destructive drought, he sailed away into the Western Mediterranean, ruling for a time over Sardinia. He was next initiated in Thrace into the mysteries of Dionysus; and after residing for a short time near Mount Hæmus, disappeared from the earth. His worship was widely diffused in all Hellenic lands, and he figures in the mythic tale as a beneficent divinity who protected and fostered the peaceful industries of mortals.

Aristarchus, the greatest grammarian and critic of antiquity, flourished at Alexandria in the 2d c. B.C. He made recensions of many ancient writers, but he specially devoted himself to the construction of a sound text of Homer, and his text has been the basis of all subsequent editions. He died at Cyprus of voluntary starvation, to escape the pain of an incurable disease.

Aristarchus, of Samos, one of the earliest astronomers of the Alexandrian school, flourished about 280-264 B.C. His only extant work gives an ingenious but unpractical method of comparing the distances of the sun and moon. Archimedes states in his *Arenarius* that A. held the true theory of the diurnal and annual motions of the earth; Vitruvius ascribes to him the invention of the *scaphium*, a kind of concave sundial; and finally, Censorinus says that he was the author of the *Annus Magnus*, or Great Year, which comprised a period of 2484 years. Only one work of A. survives, which was first published at Venice in 1498, and again by Wallis at Oxford in 1688. It has been translated into French by D'Urban (Paris, 1823).

Aristæas, according to a tradition reported by Herodotus, a magician whose soul could quit and return to its body at will. After visiting the Arimaspeæ and the Hyperboreans, he described what he had seen in an epic of three books entitled *Arimaspeia*. Of the existence of such a poem there can be no doubt, but even the ancients did not believe A. to be its author.

A. is also the name of a Cyprian, represented as an officer at the court of Ptolemy Philadelphus, to whom was long ascribed a remarkable letter (now considered a fabrication), giving an account of the Egyptian embassy to Jerusalem to obtain translators of the Pentateuch into Greek. See SEPTUAGINT.

Aristides, surnamed 'The Just,' was the son of Lysimachus, of one of the leading families of Athens. One of the ten leaders chosen to oppose the Persian invasion, A., setting the example, prevailed on the others to make Miltiades commander-in-chief on the field of Marathon. For some time after the victory A. held the office of chief archon; but by an intrigue of Themistocles, and by popular fickleness, he was subsequently banished from Athens by 'ostracism.' After the victory of Salamis, in which he took a generous part, A. was restored to popular favour—being in command of the Athenian forces at the victory of Plataea in 479. Elected archon a second time in 468, he assured the welfare of Greece and the pre-eminence of Athens by his wisdom and moderation. A. died B.C. 468. He died as he had lived—a poor man, as regards material wealth. He is one of the finest characters of antiquity. His life has been written by Plutarch with his customary grace and dignity in the delineation of character.

Aristippus, a Greek philosopher, was born at Cyrene, in Africa, about 424 B.C. He went at an early age to Athens, where he became the pupil of Socrates, to whose teaching, however, his own is directly opposed. He is the founder of what is called the Cyrenaic school of philosophy among the Greeks—a philosophy which is essentially a form of Epicureanism, teaching that it is wiser to seek pleasure than pain, better to be happy than sad; that the morality of action consists simply in its results, as affecting the welfare of others. A. spent much of his time at the court of Dionysius of Syracuse, where he was noted as a philosophic man of pleasure. He imbued his daughter Arete with his principles; these she again taught to her son, A. the Younger. By him they are supposed to have been worked into a system known as *Hedonism*, or the philosophy of pleasure. See Wieland's historical romance, *Aristipp und einige seiner Zeitgenossen* ('A. and some of his Contemporaries').

Aristobulus, an Alexandrian Jew, probably a Galilean by birth, was the first (B.C. 160) of a series of Jewish philosophers, poets, and historians who mediated between Judaism and the Gentile world. With the LXX. as a centre, they formed an elaborate literature, transforming Moses into a Greek philosopher, and the philosophers into the patrons and clients of Hebrew wisdom. He was long credited with being the author of the *Exegetical Commentaries on the Books of Moses*, which consisted of forged extracts from some of the oldest Greek authors, intended to show that they had borrowed from the Old Testament.

Aristocracy means, etymologically, a form of government in which power is in the hands, not of the mass, but of a select few, presumably the fittest for the office, the superior aptitude arising either from demonstrated personal ability or from the inherited wealth and consequent culture of successive generations. Among the Greeks and mediæval writers the word is only used as denoting a form of government. But in this sense it has never been popularly used in England, owing to the fact that in England aristocratic government has never existed, unless it was in the days when Cromwell ruled the land. A. in England denotes a special class of the community invested with peculiar privileges, and possessing a social influence more powerful there than in any other country in the world. Strict definition is impossible. No ordinary wealth will admit any one to the aristocratic society of England. On the other hand, a certain wealth is requisite for any one to move comfortably in it. Again, the minutiae of social culture are more rigidly insisted on by the well-born and well-educated in England than in any other country. An Englishman may be wealthy, clever, and accomplished; yet if he calls a horse an 'orse,' or uses his knife in place of his fork, the flaw would be fatal to any aristocratic claim.

Aristogeiton. See HARMODIUS AND ARISTOGEITON.

Aristolochia, a genus of Dicotyledonous plants, the type of the order *Aristolochiaceae*. Most of the species are climbers in habit, and have a singularly-coloured, inflated calyx. They are found in tropical Africa, S. America, N. America, Europe, and Asia. *A. Clematitis*, or common birthwort, is a doubtful native of Britain, being generally found in the neighbourhood of ruins. Its roots were formerly used medically in parturition, hence its English name. Other species had a similar reputation. *A. serpentaria* is called Virginian snakeweed, from its being used as a serpentine drug in some parts of America as a cure for the bites

of snakes and mad dogs. It is also used as a stimulant in cases of fever. One or more species of A., called Guaco, is used for similar purposes by the natives in Central America. When a drop or two of the drug is placed in the mouth of the snake, it produces stupidity; but if an overdose is given, it results in death. *A. Siphon* is cultivated in gardens under the name of pipe-vine, from the form of the flowers resembling a tobacco-pipe. *A. grandiflora* is a handsome species cultivated in hothouses. Its roots have a powerful nauseous odour, and are said to kill any animal that eats them. The flowers of many species form a sort of fly-trap. *A. Indica* is common to India and Australia.

Aristophanes, the only writer of the old Greek comedy of whom any entire works are extant, and one of the greatest masters of Attic Greek, was born about B.C. 444. He was a native of the Attic borough Cydathene, and in early life was a pupil of Prodicus. He was of a social and convivial temperament, and passed the life of a lover of pleasure; but the profoundest historical and poetical interest is awakened by the wonderful series of comedies in which, with unsparing hand, he lashed the evils, follies, and extravagances of Athenian life. He was the author of fifty-four plays, of which only eleven are extant. Of these the earliest was the *Acharnians* (B.C. 425), in which he inveighs against the Peloponnesian war, and represents the evils of war by a comparison between Dicaeopolis, a native of Acharnae, who made a separate peace for himself and his family, and Lamachus, the representative of the war-party. In the *Knights* (B.C. 424) A. attacked the insolent demagogue Cleon with such scathing satire that the latter brought an action against the poet to deprive him of his civic rights. In B.C. 423 was exhibited the *Clouds*, the best of all his comedies. In it he attacked the school of sophistical philosophy, of which he made Socrates the impersonation, and throughout the play the great philosopher and moralist is represented as teaching Pheidippides to cheat his creditors, beat his father, and disregard the gods. This can best be accounted for by the considerations that A. could not appreciate the true character of Socrates, that Socrates was the most prominent of the public teachers, and that his snub nose, bare feet, careless dress, and strange manners were ready materials for caricature. In the *Wasps* (B.C. 422) A. attacked the flagrant litigiousness of the Athenians. The *Peace* (B.C. 421), like the *Acharnians*, exhibited the miseries of war. The *Birds* (B.C. 414), in which the Athenians, under the figure of the birds, are persuaded to build a city in the clouds, which is to cut off all communication between gods and men, is a powerful satire on the Sicilian expedition. In B.C. 411 appeared the *Lysistrata* and the *Thesmophoriazusae*, the latter commencing the attack on Euripides which was continued in the *Frogs* (B.C. 405). The *Ecclesiazusae* (B.C. 392) ridiculed the theories of Plato and the institutions of Sparta; and the *Plutus* (B.C. 388) was an allegorical satire on the rich. A. died probably not later than B.C. 380. The *editio princeps* appeared at Venice in 1498. More recent editions are those by Brunck (Strassb. 1781-83), by Dindorf (Leipz. 1826), Bekker (Lond. 1829), and Dindorf (Paris, 1838). There are English translations by Hookham, Cumberland, &c.; French by Artaud, Poinset de Sivry, &c.; and German by Voss, Droysen, &c.

Aristotelia. See MACQUI.

Aristotle, the weightiest, and, except Plato, the most illustrious of Greek philosophers, was born at Stageira, in Chalcidice, B.C. 384. His father, Nicomachus, who was physician to Amyntas II., King of Macedon, died before his son had reached his seventeenth year, and A. was intrusted to the guardianship of Proxenus. In B.C. 367 A. went to Athens, where he passed the succeeding twenty years of his life. During the first three years, while Plato was absent in Sicily, he engaged chiefly in private study. On Plato's return, A. became pre-eminent among his pupils, and was called by his master the 'Intellect of the School.' The remainder of his residence at Athens was spent in study, uninterrupted, save by his warm controversy with Isocrates, the distinguished teacher of rhetoric. After Plato's death, disappointed, possibly, that he had not been chosen to succeed his great master, he left Athens, B.C. 347, and went to Atarneus, in Mysia, where he lived for three years with his former pupil Hermeias, the ruler of the city, on whose assassination by the Persians, B.C. 343, he fled to Mitylene with his wife Pythias. In B.C. 342 he accepted the invitation of Philip of Macedon to become the

tutor of his son Alexander, then thirteen years of age. This relationship between the great philosopher and the future conqueror continued for four years; and its beneficial effects may be traced in Alexander's love of physical exercise, interest in philosophy and literature, and intimate intercourse with his old master, which lasted till it was painfully interrupted by the murder of Callisthenes. In B.C. 335 A. returned to Athens, and founded the famous Peripatetic school, to which he soon attracted numerous pupils. Here, during twelve years, in the shady walks of the Lyceum, to his select followers in the morning, and to a wider circle in the afternoon, he expounded in regular lectures the principles of philosophy, rhetoric, and politics; and at this time too he composed the greater portion of his works. On Alexander's death, A. was accused by his enemies in Athens of impiety, and fearing the fate of Socrates, he retired to Chalcis, where in the same year he died, B.C. 322. Numerous as are the genuine extant works of A., they form a small portion of what he actually wrote. Many of them seem to be mere outlines of lectures, and they treat of every subject in the whole range of the learning of his time. His writings on *Physics*, from their defective method, are necessarily incomplete and unsatisfactory. The *History of Animals*, a voluminous work, the extent, if not the existence, of which was due to the munificent aid of Alexander, is a vast treasure-house of well-classified facts in natural history, being, according to Cuvier, not so much a zoology as a general anatomy. The *Metaphysics* received its title in an arbitrary manner, because in the order of arrangement of his works it came after the *Physics*. It is an abstruse treatise on the science of 'that which is,' the universal, the first principles and causes of things, called by A. the absolute philosophy, wisdom, theology. The *Poetics* and the *Rhetoric* are well-known treatises on these two forms of the exercise of the creative faculty. The *Economics*, the first book of which alone is genuine, treats of the domestic relations, and uses them to illustrate the relations of the various members of the State. The *Nicomachean Ethics*, named after his son Nicomachus, and by some scholars attributed to him, is the earliest treatise devoted to the special discussion of morals, and much of its penetrating thought has been embodied in later ethical systems. The *Politics*, a work based on a collection of 158 constitutions made by A. himself, is designed to show how the happiness of the State may be secured, and contains a searching investigation into the principles of the various constitutions, the opinion of the philosopher himself tending towards monarchy. This catalogue of A.'s principal works may be fitly closed with the *Organon*, for logic occupies a most prominent place in the Aristotelian philosophy; and it is not too much to say that he was at once the creator and the completer of the science and art of reasoning. It is impossible to avoid contrasting A. and his master Plato, to whom it is pleasant to note that he always shows marked respect, even when opposing his views. 'Plato considered the sensible as transitory, changeable, and therefore untrue: it was but an imitation of that which alone had true existence, the ideal world. With A., experience of the sensible is the starting-point; from the actual he ascends to the ideal. He begins with the impressions made upon the senses from without, and advances step by step through each operation of consciousness, until he arrives at the highest energy of the intellect. A. does not, like Plato, consider the sciences as mutually connected parts of one harmonious whole, but parallel to, and independent of, one another. A.'s method is plain, simple, and uniform. After clear definition of his subject, and adequate criticism of pre-existing doctrines, he traces the object of his treatise, and develops its parts from its simplest principles to its most complicated results.' Though differing widely in style, method, and mental constitution, the great master and pupil divide between them the supremacy of the intellectual world.

The influence of A. as a thinker was less predominant in antiquity than during the middle ages. Although his greatness was felt and acknowledged, and his works frequently copied by scribes, and commented on by the Alexandrine critics and philosophers, it was not till the Arab followers of Mohammed had acquired, by their Persian conquests, a taste for science and literature, that his genius began to exercise its almost superhuman authority. The wisdom which Justinian had banished from the schools of Greece, and which found a home at the court of Khosru Nushirvan, was soon carried by the victorious arms of the Moslem into the most distant regions of the West. What Avicenna did in Bagdad, Averrhoes did in Cordova.

Arabic versions of the Greek originals became the basis of Latin translations for the scholars of Western Christendom; but gradually a knowledge of the originals themselves was obtained, especially after the Crusades, and before long the Universities of Paris and Oxford were filled with crowds of implacable disputants, who regarded A. as an almost infallible master. The exclusive devotion of the schoolmen to his logic, and their misuse of his method, brought about a reaction on the revival of learning, and the name of Bacon is associated with an imaginary antagonism to the 'mighty Stagirite.' But the scope of his philosophy is now better understood, and almost every country of Europe has furnished critics and editors of his works, of whom Bekker (Berl. 1831) is perhaps still the best. Translations also exist in English, French, German, and other languages.

Aristoxenus, of Tarentum, a Peripatetic, and writer on music, flourished about 330 years B.C. Suidas says he produced 453 treatises in all departments of literature, of which we only possess his *Elements of Harmony*, and a few fragments. The best edition of the *Elements* is that of Meibomius (Amst. 1652). It is said that A. expected to have been appointed successor to Aristotle, and was much chagrined when Theophrastus was chosen. His musical system consisted in judging of *intervals* by the ear, in opposition to the Pythagorean system of determining them arithmetically.

Arithmetic (Gr. *arithmos*, number) means the science of numbers, and as such is properly applicable to algebra. It is now, however, restricted to the application (not investigation) of the properties of numbers to practical calculations.

Not till the introduction of the decimal system and the Arabian numerals, when the science was freed from the thralldom of a cumbersome and inconvenient notation, did A. make much progress. Since then, however, it has made great advances. The discovery of compound proportion, and the introduction of decimal fractions in the 16th c., constitute a great epoch in the history of A. The last great step was the invention of logarithms in the 17th c.

Arithmetical Mean is that number which lies midway between two others, and is equal to half their sum.

Arithmetical Progression is a series of numbers which increase or diminish by a common difference. The sum of such a series is found by multiplying the sum of the first and last terms by half the number of terms; and the last term is the algebraic sum of the first term, and $(n - 1)$ times the common increment (where n is the number of terms).

Arithmetical Signs are symbols used for the sake of brevity, to denote the various arithmetical operations to be performed on numbers. Thus, + (plus) is the sign of addition; - (minus) of subtraction; \times of multiplication; \div of division. 7^5 means that 7 is to be raised to the fifth power; $\sqrt[5]{32}$ means that the fifth root of 32 is to be extracted. The same signs are used in algebra.

Arianus, from whom the doctrine called Arianism got its name, was a native of Libya, and born about the middle of the 3d c. At the end of the 3d c., the doctrine of the Logos, as a secondary God become man in Jesus Christ, which had first appeared in the works of Justin Martyr, and been developed by Tertullian, Clement, and Origen, was apparently the prevalent doctrine of the Church. The Son was a God, but subordinate to the Father. But now there began a divergence of opinion, some holding to the subordination of the Son; others, to satisfy their feelings of piety, which could not exalt Christ too much, sought more and more to raise him to an equality with God. This last was the current of Christian sentiment at the time, and A. became a heretic for struggling against it. The abuse with which he has been loaded by Church historians has been due to the writers projecting the notions of their own time back to that when the Arian controversy took its rise.

A., who had become pastor of a parish in Alexandria about the beginning of the 4th c., fearing the above tendency would lead either to Sabellianism (which held the three persons of the Godhead to be merely three *modes* of the divine essence) or to Ditheism, set forth in distinct terms the inferiority of the Son to the Father; a point on which all were agreed. It was the doctrine of the Church according to the Council of Antioch, which condemned at the same time Paul of Samosata and Sabellius. But if, said

A., the Son is subordinate to the Father, he is not absolute God; in other words, he is not equal to the Father. Not being equal, he is not of the same substance. If he were, that substance being perfect, he would himself be perfect, and there would be two Gods equal in everything. Besides the uncreated One there can only be created beings, *i.e.*, beings created in time by God out of nothing. The Son, therefore, is not eternal, but merely the first and most excellent of the creatures; there was a time when he was not. In a word, the Son is neither consubstantial nor coexistent with the Father. These two negatives were the leading points in what came to be known as Arianism. The Bishop of Alexandria, whom A. had previously accused of Sabellianism, called a synod in 321, at which A. was deposed and excommunicated. He found sympathy and support, however, among the bishops of the East, who tried in vain to settle the dispute. On the contrary, it grew more bitter, and spread over the whole empire, to the great annoyance of the Emperor Constantine. After trying in vain to impose silence on the two parties, the emperor convened a council at Nicea, in Bithynia, for the purpose of restoring peace. Three parties were represented at this famous council (325)—the Arians, whose doctrine is stated above; the opponents of A., whose views were defended before the council by Athanasius, an archdeacon of Alexandria, who thereafter became the champion of the absolute deity of Christ; and a third party, including the majority of the members, who did not agree with either, thinking that A. stated the truth too roughly, and charging Athanasius with innovation. The opponents of A. got the ear of Constantine, and in the end all but three yielded to the imperial pressure, and decreed the perfect equality of the Son with the Father. A. and two others were deposed and banished. But the opinions of A. were not crushed. Having friends at court, he was recalled from exile (328), and had an interview with the emperor (330), who merely required from him a confession couched in general terms. Satisfied with that, he desired that A. should be reinstated at Alexandria; but Athanasius, who was now bishop there, refused to receive him, and a series of tumults ensued. Eusebius, Bishop of Nicomedia, called a synod at Tyre, and deposed Athanasius, who in his turn was banished by the emperor. A. was about to make a triumphal entry into the Church of Constantinople, when he died suddenly of a bloody flux, which was viewed by his opponents as a divine judgment, by his friends as the result of foul play.

At the death of A., the West only was faithful to the Creed of Nicea; the friends of A. holding, however, intermediate opinions, and hence called Semi-Arians, were strong in the East. After numerous disputes, schisms, &c., the Semi-Arians were reconciled to the Athanasian party, and the majority of the Church was won over to the Nicene doctrine. The conversion of the Goths and other Teutonic nations by Arian missionaries imperilled for more than two centuries the fortunes of the Trinitarian creed, which, however, finally triumphed by the zeal of successive bishops of Rome, and Arianism died out before the close of the 7th c.

Arizona, a territory of the United States, bounded N. by Utah, E. by New Mexico, S. by the Mexican Confederation, and W. by Nevada and California. Area, 113,916 sq. miles; settled pop. (1870) 9658, besides over 32,000 Indians. A. forms part of the great western plateau of North America, has a southward slope, and is crossed from N.E. to S.W. by high ranges, mostly spurs of the Rocky Mountains. Individual peaks attain a height of 12,000 to 14,000 feet. The territory is drained by the Colorado (q. v.) and its tributaries of which the principal are the Little Colorado, the Gila, Bill Williams' Fork, Yampa Creek, and Diamond River. A marvellously striking feature of the A. plateau is the way in which it has been riven in all directions to great depths by these rivers. The channels thus formed are known as cañons, and sometimes show perpendicular walls many thousand feet in height. The most famous is the Grand Cañon of the Colorado, 400 miles in length, and ranging in the altitude of its walls from 1500 to 6000 feet. A. is mineralogically one of the richest regions in the United States. Gold and silver are mined everywhere. It has also quicksilver mines (La Paz); tin, nickel, and cinnabar, copper, iron, bituminous coal, salt, sulphur, &c., are found; and various kinds of precious stones (opals, garnets, sapphires, &c.) are abundant. The soil is naturally fertile, and with proper irrigation would yield large crops. It is also admirably

adapted for grazing. In 1870 the total value of farm produce was \$227,998. Up to June 30, 1872, A. had sent to the United States' Mint for coinage \$1,015,274, but most of its silver ore was sent to Swansea in Wales for reduction, and the bullion afterwards sold in London. A. was organised as a separate territory in 1863. The capital, Tucson, in the Santa Cruz valley, 70 miles N. of the Mexican frontier, has a church, several schools, and a newspaper. Pop. (1870) 3224.

Arkansas, one of the United States of America, bounded N. by Missouri, E. by the Mississippi river, S. by Louisiana and Texas, and W. by Texas and Indian Territory. Lat. 33° to 36° 30' N.; long. 89° 45' to 94° 40' W. Length, 242 miles; breadth, 170 to 229 miles; area, 52,198 sq. miles.

In the E. portion the surface is low and marshy, and the climate unhealthy. In the centre and W. it is hilly and more salubrious. It is well watered by the A., the Washita, the White River, the Red River, the St Francis, &c. The soil varies greatly; the chief products are cotton, Indian corn, wheat, and oats. Iron, coal, zinc, lead, manganese, gypsum, and salt are among the minerals. Wild animals are still numerous—buffaloes, elks, stags, beavers, otters, bears, and wolves. The manufactures are unimportant. Pop. (1870) 484,471; *i.e.*, with an area equal to England, it has a population less than Manchester. Capital, Little Rock. A. was settled by the French in 1685 (their first settlement being A.-Port, now a village just below the mouth of the river A.), and came into the possession of the United States by purchase in 1803, as part of Louisiana. It was organised as a separate territory in 1819, and was made a state in 1836. In the war of 1861-65 it sided with the Southern States.

Arkansas River, a large river of the United States. It rises in the Rocky Mountains, on the borders of Utah, and joins the Mississippi in lat. 33° 55' N., and long. 91° 10' W., after a course of 2170 miles, receiving in the Indian territories the waters of the Canadian and Poteau from the right, and of the Verdigris and Illinois from the left. During the periodical swell, it is navigable to the Rocky Mountains, and at other times for 600 miles from its mouth. After the Missouri it is the largest affluent of the Mississippi.

Arklow, a seaport in the S.E. of Wicklow County, Ireland, at the mouth of the Avoca, with extensive herring and oyster fisheries. The river is spanned by a bridge of nineteen arches. Sandbanks greatly obstruct the harbour. Near A. is Shelton Abbey, the seat of the Earl of Wicklow. Pop. 3500. The name A. is conjectured to be Danish, but its etymology is uncertain.

Ark of the Covenant, a description of which is given in the 25th and 37th chapters of Exodus, was an oblong wooden chest, about 4 feet 4 inches long, by 2 feet 8 inches wide, and 2 feet 8 inches high, and plated with gold outside and inside, which was placed in the innermost apartment of the Jewish tabernacle and temple. The lid was of solid gold, and called the mercy-seat. Upon it, facing each other at the ends, were the figures of two cherubs. Within the A., according to Dent. x. 2, were the two tables of the law. According to the Epistle to the Hebrews (ix. 4), besides the tables, there were in it the golden pot with manna (Exod. xvi. 34), and Aaron's rod (Num. xvii. 10). If so, they had been removed by the time of Solomon, for it is distinctly stated (1 Kings viii. 9), that there was nothing in it when placed in his temple but the two tables.

The real significance of the A. seems to depend on the answer to the question, Was the mercy-seat merely a cover for the A., or was it occupied by any object? Some of the reasons for supposing that it was not unoccupied, as is generally assumed, may be briefly stated: 1. Among the Egyptians, Phœnicians, and other ancient nations, an A. or chest was kept in the innermost sanctuary of their temples, which, as seen on the Egyptian sculptures, bears the most exact resemblance to that described in the Old Testament, except that between the cherubs there is the truncated cone or symbol of the generative principle in nature. 2. That the mercy-seat was to be something more than a mere lid to the A. is evident from the fact that it was not made of wood plated with gold, like the A. itself, but of solid gold. 3. The office of Cherubs (q. v.) was that of guardians; and what would have been the meaning of their stooping over the mercy-seat, with wings spread out like a screen, had there been nothing be-

tween them; and that there was something seems to be the plain meaning of Exod. xxv. 22, 'There I will meet with thee, and I will commune with thee from above the mercy-seat, from between the two cherubim which are upon the A. of the testimony.' 4. Of the four names applied to the A.—A. of Jehovah, A. of the Covenant (of Jehovah), A. of the Testimony, the A.—the first is used in all the oldest narratives, and it is sometimes distinctly spoken of as the abode of Jehovah; see Num. x. 35, 36; 2 Sam. xv. 25 (it=Him), &c. 5. The Eduth, always translated 'Testimony,' does not always refer, as is supposed, to the tables of the law (see Exod. xvi. 34; xxv. 16, 21, &c.), although it is true that in Deuteronomy this Testimony, whatever it was, is transformed into the tables. 6. And what did the prophet Amos mean when he said (v. 26), they had 'borne for forty years in the wilderness' (which could not refer to any temporary outbreak of idolatry) 'the tabernacle of their king, the pedestal of their image, the star of their god, which they had made for themselves?' From which hints, all taken together, there seem some grounds for believing that the Jewish A., as it exactly resembled those used by other nations in every other respect, so also in this, that on the mercy-seat there was at one time, if not always, some representation of Jehovah, which was sometimes put in the A.

Arko'na, a promontory in the N.E. of the island of Rügen, in the Baltic, is mentioned as far back as the time of Saxo Grammaticus (q. v.). It was noted for a temple of the Wendish god Swantewit, which stood within a sacred enclosure, and which was captured and destroyed in 1168 by Waldemar, King of Denmark. A lighthouse was erected on its site in 1827, which is visible at a distance of more than 30 miles.

Ark'wright, Sir Richard, a celebrated inventor, was born at Preston, December 23, 1732. Being the thirteenth child of very poor parents, he had few opportunities of mental or literary culture. He first followed the trade of a barber, which he gave up in 1760 to become a dealer in hair. About 1767 he made the acquaintance of a watchmaker of the name of Kay, in Warrington, and with his help (for he had no knowledge of mechanics) projected a cotton-spinning machine. Henceforth his whole attention was directed to the subject of inventions for spinning cotton. His first machine—the spinning-frame—was set up at Preston in 1768, but excited such furious indignation on the part of the operatives that he removed to Nottingham, and there erected in the following year a mill worked by horse-power to carry out his invention, which he had patented. A. had no means of his own, but he had fortunately entered into partnership with one who had, Mr Jedediah Strutt, the improver and patentee of Lee's stocking-frame; and several improvements suggested by the latter were adopted by A. In 1771 the partners built a second spinning-mill, worked by water-power, at Cromford, in Derbyshire. Owing to the strenuous opposition of other manufacturers, it was not till five years had elapsed from the establishment of this mill that any profits were realised; but after that time wealth continued to flow in abundantly. In 1783 the partnership was dissolved, A. retaining the works at Cromford, while Strutt continued those at Belper, which had been founded about 1776. In 1786, A., as High-Sheriff of the county of Derby, was knighted on presenting an address to George III. after the attempt on the king's life by Margaret Nicholson. He died at Cromford, under a complication of disorders, on 3d August 1792. His only son, Richard (born 1755, died 1843), carried on the business with the same sagacity and business talents which had characterised his father, and was said to have been the richest commoner in England.

Arles (anc. *Arelate*), a town in the department Bouches du Rhone, France, on the Rhone, 26 miles from its mouth. It is very old, having been the seat of a Roman prefect, and the residence of the Emperor Maximian. The Gothic king Eurich made it his residence; and in 879 it was the capital of the Burgundian kingdom of Arelate. A. contains many Roman remains, among them those of an amphitheatre built to hold about 30,000 persons, of a theatre, of a palace of Constantine the Great, of temples, triumphal arches, &c. In the 3d and 4th centuries several ecclesiastical synods were held here. A. now has considerable manufactures of silk, tobacco, brandy, and hats, and possesses a good haven, a naval school, a college, and public library. Pop. (1872) 15,120.

Ar'lon, the capital of Luxemburg, Belgium, on the Brussels Railway, with a trade in iron and corn, and manufactures of linen and woollen stuffs, leather, tobacco, &c. It suffered greatly in the wars of Louis XIV., and was pillaged by the French in 1793. Pop. about 5760. In the *Itinerary* of Antonine it is mentioned as *Orolaunum vicus*, and from the number of coins, inscriptions, &c., found here, must have been of some importance in the times of the Romans.

Arm. This is the name given to a part of the anterior extremity in man. The anterior extremity may be anatomically divided into (1) the shoulder, (2) the arm, (3) the wrist, and (4) the hand. The arm is subdivided by anatomists into the arm and forearm.

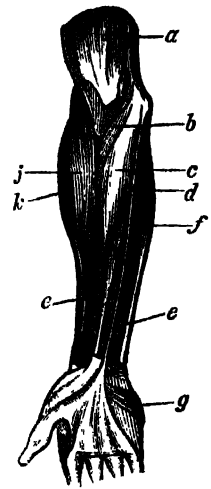
1. *Bones*.—There is one bone in the arm called the humerus, and two in the forearm, the radius and ulna. The humerus articulates with the glenoid fossa of the scapula or shoulder-blade above, forming the shoulder-joint. At the other extremity it forms the elbow-joint with the upper articular surface of the ulna. The radius articulates above with the ulna, and below it supports the semi-lunar and scaphoid bones of the carpus or wrist.

2. *Muscles*.—In front of the humerus there are three muscles, the *coraco brachialis*, the *biceps*, and the *brachialis anticus*. The biceps raises the arm at the shoulder-joint, is a powerful flexor of the elbow, and also assists in supination, that is, turning the forearm so as to direct the palm upwards. The brachialis anticus flexes the elbow; the coraco brachialis draws the arm inwards. On the back of the arm there is a very powerful muscle, called the triceps, which extends the elbow-joint. In the forearm the muscles are divided into great groups: in front there are flexors of the wrist and fingers, and pronators which so rotate the radius as to direct the palm downwards; while behind there are antagonistic groups of extensors and supinators.

3. *Arteries*.—The arm is chiefly supplied by the brachial artery, which is a continuation of a large vessel in the armpit, termed the axillary. During its course down the arm, the brachial gives off several branches, and finally terminates below the bend of the elbow by dividing into the radial and ulnar arteries. The radial is a continuation of the brachial, and extends along the front of the forearm as far as the lower end of the radius, where it passes into the palm. It is the vessel which is usually employed in observations on the pulse. The ulnar extends along the inner side of the forearm into the palm of the hand. Both of these arteries give off numerous branches during their course, which supply the muscles and other structures of the forearm.

4. *Veins*.—The blood is returned from the hand, wrist, forearm, and arm by two sets of veins, the superficial and the deep. The former are the larger, and collect so as to form three, the radial on the radial side of the forearm, the ulnar on the ulnar side, whilst between the two there is a larger one termed the median. This middle vein, at the bend of the elbow, divides into two. On the other side there is the median cephalic, which, uniting with the radial, forms the cephalic vein; on the inner side the median basilic, which, uniting with the ulnar, forms the basilic. The latter (median basilic) is the vein usually opened in blood-letting. The cephalic vein terminates in the axillary vein in the armpit, and the basilic unites with one of the companion veins of the brachial artery, or with the axillary vein. The deeper veins of the arm are companion veins to the various arteries.

5. *Nerves*.—The nerves of the arm are derived from a great plexus in the lower part of the neck, termed the brachial plexus. See BRACHIAL PLEXUS. They are divided into cutaneous and muscular. The former confer sensibility on the parts to



Right Forearm: Superficial Flexor Muscles.

- a, biceps flexor cubiti.
- b, pronator radii teres.
- c, flexor carpi radialis.
- d, palmaris longus.
- e, flexor digitorum sublimis.
- f, flexor carpi ulnaris.
- g, palmaris brevis.

which they are supplied, while the latter supply the muscles and excite their power of contractility. They are—

(a.) *Internal cutaneous*. This nerve supplies the skin of the anterior and posterior surface of the forearm.

(b.) *Small internal cutaneous*. This nerve supplies the skin of the lower half of the arm on its posterior and internal aspects.

(c.) *Musculo-cutaneous*. It supplies the muscles in front of the arm, and the skin on the outer side of the forearm.

(d.) *Ulnar nerve*. This nerve supplies certain muscles on the anterior aspect of the forearm, the elbow and wrist joints, the skin on the lower part of the forearm, and the hand on its palmar and dorsal surfaces.

(e.) *Median nerve*. It supplies pronator and flexor muscles, and gives cutaneous branches to the thumb, index, middle, and one side of the ring fingers—the remainder being supplied by the ulnar.

(f.) *Musculo-spiral*. This nerve supplies the extensor muscles both of the arm and forearm, and to the posterior and outer aspect of the lower part of the upper arm, forearm, and hand.

6. *Lymphatics*.—These originate in the hand, receive numerous branches from all parts of the forearm, pass into small lymphatic glands placed near the bend of the elbow, receive other branches from the arm, and finally terminate principally in a group of glands in the armpit known as the axillary glands. The glands at the bend of the elbow and in the axilla are often swollen and painful during inflammation or suppuration in the hand or fingers.

All of the foregoing structures are bound together by connective tissue and aponeurosis, whilst underneath the skin there is usually a layer of fat.

Arma'da (the Spanish form of the Lat. *armata*, armed) means, among the Spaniards, any armed naval expedition, but is used in English to denote the great fleet launched against England by Philip II. of Spain, called by him the 'Invincible,' but always spoken of by us as the 'Spanish' A. It consisted of 130 vessels, mostly of very large size, bearing 19,295 soldiers, 8000 mariners, 2000 oarsmen, and 2000 volunteers of the most distinguished families of Spain. The English force held in preparation to meet the A. amounted to only 30 vessels, but, before the actual collision of the fleets, was augmented, by volunteers and otherwise, to 181, mostly small vessels, carrying 17,472 men. The Duke de Medina Sidonia and Ricaldo (vice-admiral) commanded the A., while the English fleet was led by Lord Howard of Effingham, supported by Drake, Hawkins, and Frobisher. The Spanish plan of attack was, after sailing through the Channel, and taking up the force of the Duke of Parma (amounting to 30,000 foot and 4000 horse) on the coast of Flanders, to descend with the combined forces upon England. The A. left Lisbon 29th May 1588, was delayed several weeks at Ferrol, to refit after a storm, and only on the last day of July was seen by Lord Howard bearing up the Channel in the form of an immense crescent, seven miles from horn to horn. Unable to deliver general battle, Lord Howard hung upon the rear of the A., and cut off or seriously damaged a number of the ships. Tracking the enemy to Calais Roads, he sent a number of fire-ships, with a favourable breeze, into their midst, thus creating consternation and confusion, of which he promptly took advantage by attacking the Spaniards, and capturing or sinking ten of their largest vessels. The A., already practically defeated, now bore away northwards, to round the N. of Scotland, and so return to Spain. No naval retreat was ever so disastrous. A terrible tempest smote and scattered them when they reached the northern seas. Only 'fifty reached Corunna, bearing 10,000 men, stricken with pestilence and death; of the rest some were sunk, some dashed to pieces against the Irish cliffs. The wreckers of the Orkneys and the Faroes, the clansmen of the Scottish Isles, the kernes of Donegal and Galway, all had their part in the work of murder and robbery. Eight thousand Spaniards perished between the Giant's Causeway and the Blaskets. On a strand near Sligo an English captain numbered 1100 corpses which had been cast up by the sea' (Green's *Short History of the English People*, p. 412). The results of the failure of the A. were that it destroyed the power of Philip on the Spanish-main, and threw open the commerce of the Indies—hitherto jealously guarded—to Britain and to all the world.

Armadillo, a genus of Edentate mammals, forming the type of the family *Dasyproctidae*, and confined in their distribution to S.

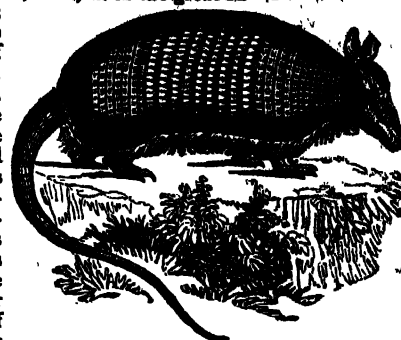
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America. The jaws possess simple molar teeth, which may number nearly one hundred, as in the great A. In one form incisors are present;

and in some of the armadillos, alone of all Edentates, a second set of teeth is developed. The limbs are short, the toes being provided with strong claws adapted for burrowing.

Well-developed collar-bones exist. The skin is covered in these forms by a coat or armour-casing of bony scutes or plates, disposed in

various ways, and so arranged as to permit of flexibility and movement. The tail is in many cases also invested with bony plates, and the animals, in some instances, possess the power of rolling themselves up into a ball-like form for protection, after the fashion of the hedgehog. Various genera and species exist. The *Dasyprocta puma*; the poyou (*D. sexcinctus*); the tatuaya (*D. tatouay*); the *D. gigas*, or great A., are familiar species. *Chlamyphorus truncatus* is a diminutive species, averaging only 6 inches in length. The food consists chiefly of insects. The tongue is smooth, and the saliva glutinous. The flesh is eaten by the natives. *Glyptodon* (q. v.) is an extinct gigantic form allied to the armadillos.



Armadillo.

Armagh, the capital of a county of the same name, on a rising ground near the Callan, 62 miles N. of Dublin. The name A., originally *Ard Macha* (Lat. *Altitudo Machæ*), 'Macha's Height,' preserves the memory of one of those semi-mythical personages to whom the oldest Irish traditions seem to cling for support. 'Macha of the golden hair' is said to have founded the place, and to have been buried here in the 3d c. B.C. After the conversion of the island to Christianity, it became the metropolis of Ireland from the year 495 to the 9th c., and its college was then in the highest renown throughout Latin Christendom. Its cathedral, which was lately repaired at a cost of £10,000, is said to be on the site of that founded in the 5th c. by St Patrick. A. is the seat of the Archbishop of A., the Primate and Metropolitan of the disestablished Irish Protestant Episcopal Church, and returns one member to Parliament. The chief industry is linen-weaving. Pop. (1871), including the suburb of Drumadd, 10,138, of whom 5243 are Roman Catholics.

Armagh, a county in Ulster, Ireland, 32 miles long and 20 broad; area, 5124 sq. miles. It is low and marshy in the N., adjoining Lough Neagh; but is hilly in the S., where it borders on Louth, the chief heights being Slieve Gullion, 1893 feet high; the Newry Mountains, 1385; the A.-Breaghy Hills ('Wolf Hills'), 1200; and Mullish, 1034. The chief rivers which flow through A. are the Upper Bann and the Blackwater, with its branch the Callan. The north and centre of A. are fertile, and very populous; in 1872, 172,554 acres were under crops. The chief towns are A., Lurgan, Portadown, and Newry. The county returns two members to Parliament. Pop. (1871) 171,260, of whom 85,057 were Roman Catholics.

Armagnac, formerly the name of a district in France stretching from the Pyrenees to the Garonne, now included in the Hautes Pyrénées and Gers. The land, producing corn and wine abundantly, is held in small estates by numerous peasant proprietors, distinguished equally by their simple morality and their ignorance. Capital, Lectoure. Pop. 2820. Principal product, *eau d'Armagnac*, a much-esteemed brandy, reckoned not inferior to cognac. In the middle ages A. gave name to a race of counts who drew their descent from Clovis, and who played an important part in French history. Bernard VII., Comte d'A., a bold and powerful soldier, took the side of the Orleanists (thence named *Armagnacs*) against the Burgundians in the civil broils that disgraced France in the early part of the 15th c., and rendered the triumph of the English arms comparatively easy.

Armament is the term used to express the complete equipment of a ship or army with the weapons of war.

Armanberg, Jos. Ludwig, Count of, an able statesman and diplomatist, was born at Kötzing, in Lower Bavaria, 28th February 1787. He entered public life in 1808, and held a great variety of offices, administrative and diplomatic. Ludwig I. of Bavaria, on his accession to the throne, appointed A. his Minister of Finance and Foreign Affairs; but his liberal opinions drew upon him the hatred of the Camarilla and the Jesuits, and forced him to resign his post in 1831. In 1833 he undertook to form the government of Greece under Ludwig's son, the young King Otho, and for four years laboured with good results for the new kingdom. Intrigue here also proved too much for him, and in 1837 he was dismissed from office. A. died at Deggen-dorf, 3d April 1853.

Armatoles, a name given by the Turks to a Greek militia force organised by Sultan Selim I., and intended to guard Northern Greece against the inroads of the *Klephas*, or patriotic brigands of Thessaly. On the outbreak of the Greek war of independence in 1820, the A. threw off the Turkish yoke, and were distinguished by their bravery in the contest that followed.

Armature (Lat. *armatura*, armour) is a term applied to a piece of soft iron which joins the poles of a magnet, the object being to preserve their magnetic power. This A. is itself a magnet as long as it is in contact with the true magnet; and thus the latter is kept in a state of constant magnetic activity, which prevents any disturbing influence from lessening its power.

Armed Ship officially denotes a private vessel hired and commissioned by the Admiralty for some special purpose, such as protecting part of the coast, or attending a fleet in time of war.

Arme'nia, in ancient times a powerful, independent kingdom of Western Asia, now partitioned unequally between Russia (Russian A., or government of Erivan), Persia (province of Azerbaijan), and Turkey (vilayet of Erzerum). The region of A. extends between the Black and Caspian Seas, and between the Caucasus on the N. and the plains of the Euphrates on the S. Its boundaries have differed at different periods in its history, and it is now only a geographical name without political significance, although the inhabitants have succeeded in preserving their language, literature, and national characteristics. The region embraces the sources of the Euphrates, Tigris, and Aras. The country consists of plateaux of from 5000 to 7000 feet, dominated by mountains, of which the highest is Ararat (q. v.), and furrowed by deep valleys. On its high plains the finest corn crops are grown in abundance, its rich pastures support good breeds of horses and cattle, while in its valleys the grape and many other fruits are indigenous. Its climate in the upland districts is subject to extremes, being rigorous in winter, and very hot in summer. A., according to one of the most widely-diffused traditions of mankind, is the cradle of the human race. The Armenians, who belong to the Aryan family, were one of the earliest civilised peoples in the world. When first heard of they were governed by independent kings, afterwards they became tributary to Assyrians and Medes, but recovered (6th c. B.C.) independence under Tigranes I., whose dynasty was, however, swept away by Alexander the Great. The country was afterwards ruled by the Seleucids (q. v.) and their governors, in whose time the division into Greater and Lesser A. took place; and subsequently by the Parthians and Romans. Early in the 5th c. the Persians made A. a province of the empire of the Sassanides (q. v.), and in the 7th c. it passed under the dominion of the Arabian califs. In 1472 Greater A. became a Persian province. A. Minor, the part of this region to the W. of the Euphrates, was conquered in 1374 by the Egyptian sultan Shaban, and since that time it has remained subject partly to the Persians and partly to the Turks, though recently, as noted above, part of the country S. of the Caucasus has become a Russian government.

Armenian Church. Christianity seems to have been introduced into Armenia during the first half of the 3d c., for Eusebius records that Dionysius of Alexandria, about 260, 'wrote concerning penance to the brethren of Armenia, over whom Meruzanes was bishop.' But the A. C. was first organised in the be-

ginning of the 4th c. by Gregory the Illuminator (so called from his work in converting the country). Having succeeded in converting the king and his nobles, he was ordained the first Bishop of Armenia by the Bishop of Cappadocia, and then laboured to diffuse the Christian religion throughout the country. In the beginning of the 5th c. a translation of the Old Testament was made by the Patriarch Isaac and Miesrob (see **ARMENIAN LITERATURE**) from the LXX., which was used in MS. till 1666, when an edition of the New Testament was printed at Amsterdam by one of their bishops.

About 460 A.D. the Monophysite doctrine (q. v.) regarding the person of Christ was disseminated in Armenia, and the A. C. has held it ever since, though differing from the other Monophysites of the East as to many opinions and practices. Except in this point, it does not differ very materially in doctrine from the Roman Catholic Church; the hierarchy differs little from that of the Greek. The Primate of the home Church is the *Catholicos* or Patriarch of Etchmiadzin. Most of the numerous Armenians in foreign countries belong to a sect called the United Armenians, acknowledging the supremacy of the Pope, and holding the Roman Catholic doctrines.

Armenian Literature. The Armenian alphabet was invented (according to tradition, however, received from heaven) by Miesrob, a learned Armenian, at the beginning of the 5th c. Having communicated it to the Patriarch of the Church, they made together a translation of the Old Testament from the Syriac. Two pupils were sent to the Council of Ephesus (431) to request a copy of the LXX.; but Miesrob and the patriarch were unable, from ignorance of Greek, to make any use of it when they got it, till other pupils were sent to Alexandria to study Greek. On the return of these young men, however, the work was soon accomplished. Fragments of translations of several Greek authors made about the same time are still in existence: the Chronicle of Eusebius; the Discourses of Philo; Homilies by St Chrysostom, Severianus, Basil the Great, and Ephraem Syrus. One of the pupils sent by the Patriarch Isaac to learn Greek at Alexandria was Moses Chorenensis, who wrote a history of Armenia. From this time till the 14th c. there were numerous theological, historical, and geographical writers; among others David, who translated the works of Aristotle, Ebnik, and Joannes Ozniensis. But the old Armenian language is no longer spoken; and the new Armenian, or spoken language, which exists in four dialects, is much corrupted with Turkish. See Neuman's *Versuch einer Geschichte der Armen. Literatur* (Leipz. 1836); Patkanian's *Catalogue de la Littérature Arménienne* in the *Mélanges Asiatiques* (St Petersburg. 1860).

Armentières, a town in France, department of Nord, on the Lys, 9 miles N.W. of Lille, clean, well built, and prosperous, with manufactures of linen, lace, hosiery, and beetroot sugar, and a brisk trade in grain, bricks, wine, brandy, and tobacco. Pop. (1872) 17,831.

Arme'ria, a genus of plants belonging to the order *Plumbaginaceæ*. See **THRIFT**.

Arm'felt, Gustav Moritz, a famous Swede, born in Finland, 1st April 1757. Having rendered important services to Gustavus III. of Sweden in his disputes with his nobles, he was rewarded by that monarch with an important military post. In the war which followed (1788-90) with Russia, he showed genius and energy, which were crowned with good fortune. He defeated the Russians at Summa; and, as the representative of his king, he made peace with them at Verela, 14th August 1790. Gustavus was assassinated in March 1792. He was succeeded by his son, a minor, Gustavus IV., under the regency of the late king's brother, the Duke of Sudermania. Becoming conscious that his court influence was fast waning under the new government, A. got himself made ambassador to Naples in July 1792. Here he entered into treasonable correspondence with certain factions in Sweden, with the view of overthrowing the regency. The plot being discovered, A. fled to Russia. He was tried in Sweden for high treason, found guilty, and deprived of his titles and possessions. These were, however, restored to him by Gustavus IV., when he received the crown in 1799. He was recalled, and appointed to military command in Finland in a war against Norway. Fortune this time went against him, and he was in consequence recalled. In the subsequent revolution

which again placed the Duke of Sudermania in power, A. was treated with consideration; but getting compromised in the poisoning of the Prince of Augustenburg, he was obliged again to retire to Russia. He was there received with great honour, being created a count, and made a member of the senate. He died at Zarskoje-Selo, 19th August 1814. His autobiography can be found in the *Handlingar rörande Sveriges Historia* (Stockh. 1830).

Armida, a beautiful enchantress, who may almost be considered the heroine of Tasso's *Gerusalemme Liberata*, and whose name has passed into literature as an exquisite type of the seductive siren. Rinaldo, the model crusader, for a time forgets his religious vows in her voluptuous bowers, but is at length delivered by the efficacy of a powerful talisman, and finally persuades the lovely emissary of Satan to embrace the Christian faith.

Armies. According to the international law of civilised nations, during war the hostile countries accord to each other, and to the army of each other, what are called belligerent rights. Thus it would be held a violation of these rights to shoot prisoners, or to refuse quarter to an army after it had hoisted the flag indicating surrender. But questions sometimes arise as to what constitutes an army, and gives an armed force a title to these rights. Mere armed bands of peasantry, for example, molesting an army of occupation, are not held entitled to the belligerent rights of an army, and prisoners are accordingly liable to be shot. A certain amount of organisation and discipline, with recognition by the proper authorities of the country, are required to constitute an army.

Armies, Ancient. The immense change in the implements of war which has taken place since ancient times, has caused a corresponding change in the strategy and tactics of modern A., as compared with those of antiquity; nevertheless, there are certain rules for individual training, and for the effective organisation of military force, which have held good in all time, and, having their foundation in human nature, must always continue to do so. Thus, the value of discipline was as great and as well known to ancient as to modern generals. If we look to the ancient Egyptians—whose great conqueror, Sesotris, lived sixteen centuries B.C.—we find that the youth of the country intended for war were from their earliest days so trained as to develop to the full their physical strength and their skill as soldiers, as subordinates and as commanders. The youth of Persia, also, in the great days of that empire, were trained and hardened to military life. Perhaps, above all, the Lacedæmonians were inured to self-denial, frugality, endurance, and all the virtues which are essential to make the successful soldier. To this training were probably mainly owing the victories of Marathon and Plataea. Yet, to their great contest with the mighty empire of Persia these ancient Greeks brought a knowledge of military organisation and tactics such as was probably at that time confined to themselves. The vast hosts of Persia, drawn from all its conquered and tributary nations, were to a great extent little better than an armed mob, which supposed that it could strike its foes with panic by force of its immensity, its elephants, its war-chariots, and other showy appliances. But every Greek was a trained soldier, and 'the pomp and circumstance' vanished into air before the serried ranks of the Lacedæmonian Phalanx (q. v.).

Again, in ancient Rome, every Roman was a trained soldier. Nor does any such doctrine seem to have been mooted in ancient times as that this physical training of its youth was so much loss to the State, by reason of its being so much time abstracted from productive labour. Their doctrine, probably, rather was that a reasonable portion of human life given to the cultivation of its vital force was—considerations of war apart—a wise and economical measure, likely even to be remunerative in agriculture and in commerce. The hardy Roman legion (see LEGION) was formed of young men who, from the age of seventeen, had been subjected to military discipline and drill—taught to camp, and march, and work out of doors. Thus, when he came to face the enemy, the Roman felt himself at home. The Roman legion was, among the military forces of ancient times, especially distinguished for its power of preserving order, and of rallying when obliged to yield. Thus, even in retreating—that important point of strategy—the fighting power of the legion was very formidable.

Armies, Mediæval. The division of the territory of the western portion of the Roman empire among the races by whom it was conquered, gave rise to what is called the Feudal System (q. v.), of which the shadow even yet remains. A standing army at the service of the king, and owing allegiance solely to him, was a thing unknown. Each baron was entitled to keep an armed force of his own. With this he was, no doubt, in terms of his allegiance, obliged to assist his sovereign when called on to do so; but, nevertheless, the substantial power so retained in the hands of the greater nobles was an effectual check on the power of the crown. The chief A. of the 14th and 15th centuries were those of France and England, those of the Moors and the Spaniards, and of the Italian republics. Of strategy and tactics there was comparatively little, and valour and enthusiasm were of more effect on the battle-field than in ancient or more modern times. Knights—'steel-clad warriors'—singled out some 'foeman worthy of their steel,' and the battle would pause to see the end of the duel; sometimes, indeed, its issue was allowed to determine the issue of the battle itself. The invention of gunpowder gradually changed all this, and effected a total revolution in the military art. This change, however, was very gradual, and can hardly be said to have taken place until after the 'middle ages.'

Armies, Modern. Towards the close of the 15th c. we begin to trace some endeavour to embody a system of strategy and tactics for cavalry, as also to train the infantry to the use of firearms. In France, Charles VII. and Charles VIII., after repeated efforts, succeeded, in spite of feudal opposition, in establishing a well-disciplined standing army, trained to the use of firearms. The strategy and tactics of the A. engaged in the great wars of Western Europe from this time began to grow into a science, and to supersede valour as determining the issue of battles and of wars. The science may be said to have culminated under Frederick the Great of Prussia, whose skill in manœuvring troops was beyond that of any general of his age. But the skill of Frederick was that of immense experience, not the intuition of consummate natural military genius; and when this did appear upon the stage in the person of Napoleon Bonaparte, the inadequacy of established routine quickly appeared. Selecting the weak point of his foe, the young general threw an overwhelming force upon it with a celerity until his own time undreamt of. Thus Napoleon gained his early victories in Italy; thus he destroyed the Austrian army in 1805, the Prussians in 1806, in both cases before the advent of the Russians, whom again, in conjunction with the remnant of their allies, he crushed at Austerlitz, Eylau, and Friedland.

The recent improvements in breech-loading rifles and cannon have revolutionised the tactics of armies, and altered the relative importance of the different branches of military service. The great lesson of the late Franco-Prussian war was that the combination of such vast numbers in the field of action, and the movement of these with the required celerity, depended principally on the application of engineering science. Prussia began the war of 1870 with 88 engineer companies, 16 telegraph and 6 railway detachments, beside several other bodies of 'technical troops.' Most European armies are now organised on a system similar to that of Germany.

We now give a few details regarding the present military organisation and A. of the principal powers of the world:—

Germany.—Under the constitution of 1871, every male subject of the German empire, capable of bearing arms, must serve in the army. After completing his twentieth year, he must be in active service for three years; four years must then be passed in the reserves. Five years more must then be passed in the *Landwehr*. During peace, the German army, organised by the law of May 2, 1874, consists of (1874) 401,659 men, with 19,752 officers. In time of war this force is raised to 1,278,619 men, with 31,546 officers. In the last war with France, the Germans had at one time in the field 1,300,000, and more than quarter of a million of horses.

France.—By the law of August 18, 1872, all Frenchmen, with a few exceptions specified, are obliged to serve in the army. They must serve five years in the active army, four years in its reserve, five years in the territorial army, and six years in its reserve. The active army of France had, in 1875, 442,014 men, which, during war, can be raised to over 1,100,000. Including the territorial army, its reserves, and reserves of the active army,

the total military force of France will amount, when the new organisation is completed, to 2,423,164.

Russia.—The Russian army is recruited by annual conscription, to which all males, without distinction of class, capable of service are liable who have attained their twentieth year. The period of service is six years in the active service, and nine in the reserve; but in the case of those called to military service in Asia the period is reduced to a total of ten years, of which seven are in active and three in reserve service. The regular Russian army, during peace, consists of over 23,500 officers, and over 750,000 men. During war, there are over 28,000 officers, and about 1,520,000 men, and 300,000 cavalry.

Austria.—All subjects of the empire are liable to military service, the period being three years of active service and seven in the reserve. There is a further liability for two years in the *Landwehr*. The total of the Austrian army during peace is (1873) 259,173 men; in war, about 772,729.

Italy.—The army is recruited under the Sardinian law of conscription, and the service is three years active and nine reserve. The total peace force is (1874) 203,279 men; during war this is raised to over 823,827; besides which there is a strong provincial militia.

Spain.—The Spanish army is stated (1872) at 80,000 men, with 136,000 of reserve. There is, besides, an army of over 60,000 in Cuba, with a small force in Porto Rico and in the Philippines. The military system is modelled on the French, and though conscript, admits of substitution.

Denmark.—All subjects of the kingdom over twenty-one are liable to military service for eight years in the regular army, and eight years in the reserve. The total of regular and reserve during peace is about (1874) 35,975 men, with over 1031 officers. During war this is raised to over 52,656.

Sweden and Norway.—The regular army has (1873) 35,646 men; the reserve 86,101; the Gothland militia 150,773. Norway has a small army of 12,000, which can be raised to 18,000.

Holland.—The total military force, officers and men, in Europe, is (1874) 62,071, exclusive of a militia. There is, besides, an army of (1872) 27,659 in the E. Indies. The system of recruiting is partly by enlistment and partly by conscription.

Belgium.—The total force, without officers, is (1874) 103,900. Recruiting is by conscription, but substitution is allowed. The service is for eight years.

Switzerland.—The total federal army has (1874) 84,045, with a reserve of 51,102, and a *Landwehr* of 65,562, making a total available military force of 201,578.

Turkey.—An obligatory system was nominally established in 1869, holding all Mohammedans liable to a service of twenty years, four being active, eight reserve, and eight *Landsturm* (*Flügel*). The regular army now (1873) is said to number in peace 157,667, and 11,540 cavalry, and on a war-footing can be raised to 486,100. By 1878 it is assumed that this will be increased to 700,000. The irregular force—*Bashibazouks*, &c.—numbers about 50,000. Egypt and other dependencies are bound to furnish contingents to the number in all of about 60,000.

United States of America.—Before the civil war, the United States only kept up a force of about 14,000 men; while, by the successive levies during the war, over 2,500,000 men had been called out by the Northern States. In 1874 the standing army amounted to 32,602 men. The militia was at last census (1870) nominally 3,245,000.

See BRITISH ARMY, EAST INDIA ARMY.

Armillary Sphere (Lat. *armilla*, a ring) consists of a number of rings which are so put together as to represent the principal circles of the heavens. It may be regarded, then, as a sphere of which every part has been cut away, except the equator, the ecliptic, the colures, &c. This instrument, however, is never used now for any practical purposes.

Arminius, Jacobus (the Latinised form of James Harmensen), was a Dutchman, born at Oudewater ('Old Water') in 1560. Educated first at Utrecht and Leyden, he then studied at Geneva under Beza, and at Basle under Grynæus, so that he was trained in the strictest Calvinism. Nevertheless, being appointed a minister at Amsterdam (1588), he soon after (1591) abandoned the Calvinistic doctrines about predestination and the divine decrees, being led, by a candid study of the writings of Coornhart, which he had been engaged to refute, to adopt the opinions of

his opponent, that God is graciously disposed to the whole human race, and that no one is absolutely excluded from eternal salvation. When appointed Professor of Theology in the University of Leyden (1604), he felt it to be his duty to controvert the Calvinistic doctrines; by which he drew on him the hostility of the Calvinistic, *i.e.*, nearly all the divines in Holland, and in particular of his colleague Francis Gomarus. A. died (1609), however, just as the long and bitter controversy was beginning to rage.

At first the controversy was confined to the points of Grace and Predestination, and the Arminian doctrine very nearly resembled the Lutheran on these subjects (see PERSEVERANCE OF SAINTS and PREDESTINATION), as appears from the five points of a 'Remonstrance' drawn up by the followers of A. (1610), and presented to a conference of the States at the Hague (1611). The substance of these articles is as follows: 1. That God made from all eternity a conditional decree to bestow salvation on those who, as he foresaw, would persevere in their faith in Christ, and to inflict everlasting punishment on those who should continue in their unbelief. 2. That Christ made an atonement sufficient, and intended for all men, but that the efficacy thereof is restricted to those who believe in him. 3. That true faith cannot proceed from the operation of free-will, since man is incapable of any good, but that regeneration by the Holy Spirit is necessary for his conversion. 4. That, nevertheless, this divine grace of the Holy Spirit may be resisted and rendered ineffectual by the perverse will of the impenitent sinner. 5. That believers are enabled successfully to resist sin; but that whether or not they may fall from a state of grace and finally perish is not clearly stated in Scripture. (This doubt was afterwards changed to the affirmative.) In reply to this Remonstrance the Calvinists prepared a Counter-Remonstrance; hence the one party was called the Remonstrants, and the other the Contra-Remonstrants. After long altercation and violent contests, the States-General ordered the controversy to be submitted to a national synod (held at Dort 1618-19), at which were present representatives from England and Scotland, Hesse, Bremen, the Palatinate, and Switzerland. At this synod the Arminians were found guilty of 'corrupting theology and holding pestilential errors.' In consequence, all were deprived of their sacred and civil offices, and those who would not submit exiled. Under the next stadtholder, however, the exiles were recalled, and enjoyed toleration. A seminary was established at Amsterdam in which their own theology was taught by Episcopius.

After the Synod of Dort, the opinions of A. were at least more clearly expressed, and came very near to a denial 'that a man needs any divine aid in order to his conversion and living a holy life.' Their whole system is directed to the one object of uniting Christians into one brotherhood, notwithstanding differences of opinion in doctrine and worship. According to them every one belongs to the kingdom of Christ who (1) receives the Bible as the rule of his religion; (2) is opposed to polytheism; (3) leads an upright life; and (4) never disturbs those who hold different opinions from himself. The sect is dwindling in nominal adherents, but their opinions are widely prevalent. A.'s writings were collected and published at Leyden 1629, and at Frankfurt 1631 and 1635. See Brandt's *Historia Vita Arminii* (Amst. 1724).

Armistice is a cessation of hostilities between two armies or nations at war, either to allow of a breathing-space when both are exhausted, or to give an opportunity for arranging a treaty of peace. For instance, during the war between the Germans and Danes in 1864, an A. was agreed upon while the London Congress was meeting, when accordingly the Danish and German armies remained most strictly at peace. The desire of an A. for a temporary purpose is indicated by the hoisting of a white flag.

Armorica, in Cæsar's time, denoted the whole country along the coast of Gaul from the Seine to the Loire, but at a later period only Bretagne. The word is a Latinised form of a Celtic name, meaning 'the region near the sea.' The Celtic *mor*, 'the sea,' entering into the composition of many Armerican names, as Morlaix, Morbihan, is also seen in the Gaelic Moray, and is cognate with the Latin *mare* and the German *Meer*.

Armour, the defensive covering used in war and military exercises, down to the period when the introduction of firearms rendered such a kind of protection impracticable. Some kind of A. was probably of almost as early invention as the weapons

of offence against which it was intended to guard. The shield, as the simplest, most obvious, and most useful defensive weapon, was the earliest adopted, and in early times it was made of wood, the hide of animals, and plaited osiers, and to these, plates of metal were added, till the entire shield of metal-work gradually developed. The remains of shields belonging to the bronze period of Central Europe, some of them characteristically ornamented, are yet numerous. The sculptured figures of ancient Assyrians and Persians represent their warriors clad in complete suits of A., and in the time of Homer the defensive weapons of the Greeks consisted of helmet, cuirass or corselet, *knemides* or greaves, and shield. The Roman legionaries were protected with helmet, breastplate, and greaves, with a large rectangular shield or *scutum*; and the cavalry in the time of Trajan wore a bronze cuirass of scales (*squamata*), or a kind of mail-coat (*ha-mata*). In Europe, from the 10th to the 15th c., mail-coats were worn, composed either of flat rings fastened on to cloth or leather; of oval rings overlapping each other; of lozenge-shaped pieces of metal; or of metallic scales. The art of wire-drawing, first practised about 1306, greatly facilitated the manufacture of chain-mail. Mail-A. gradually gave way to complete suits of plate-A., which system of equipment reached great perfection about the early part of the 16th c. A knight armed *cap-à-pie* during the middle ages wore the helmet or casque; neck collar; cuirass, composed of breast and back plates; shoulder-plates, arm-guards, and palettes to protect the arms; brayette, and loin-guard, to protect the abdomen; cuishes, knee-plates, and greaves for the legs; solerets for the feet, and gauntlets for the hands. A system of protective A. for war-horses was also used in the middle ages. Some suits of A. manufactured in the 16th c. are masterpieces of artistic skill. One, by the German armorer Kollman, for a mounted warrior, now in the Dresden Museum, decorated with subjects representing the labours of Hercules, cost 14,000 crowns. The introduction of gunpowder gave the deathblow to defensive A., and from the end of the 15th c. its use gradually declined, till it altogether disappeared before the end of the 17th. Relics of the system are yet seen in the metallic helmet and cuirass worn by some cavalry regiments.

Armourer, a name applied to the artificers who in ancient and mediæval times were employed in the fabrication of weapons of offence or defence. Many armourers have become famous owing to the perfection of the metal in which they wrought and the beauty of their workmanship; others are renowned for the artistic finish of the shield, mail, and defensive accoutrements fabricated by them. For making suits of defensive armour, the armourers of Italy and Germany were most highly esteemed. The brothers Nigroli and Hieronimo Spacini (*temp.* Charles V.) were among the most famous Italians; Kollman and Seussenhofer being the leading German artificers of the same period. In the manufacture of sword-blades, the armourers of Toledo excelled; but those made by Andrea di Ferrara, an Italian in the 16th c., are most highly prized. The skilled artisans attached to regiments and war-ships to care for and repair weapons are called armourers.

Armour Plates, the thick plates of rolled iron used for the defensive protection of modern war-vessels. The system of armour-plating was first applied to the French vessel *La Gloire* and the British *Warrior*. In the case of the *Warrior*, the A. P. were $4\frac{1}{2}$ inches thick, and they were applied only to a certain portion of the vessel, leaving both extremities unprotected. Several vessels in the English navy were built on this type. In other ships built later, the hull is protected from stem to stern, the thickness of the armour is increased to 5, 6, 7, 8, 9, 11, 12, and even 20 inches, the thickness being in recent vessels varied according to the vulnerability of the point to be protected. The resisting power of these plates is increased in most vessels by thick backings of teak, and an iron skin varying from $\frac{3}{4}$ to 1 $\frac{1}{2}$ inch in thickness. The law of resistance of A. P., established by experiments on plates up to 5 $\frac{1}{2}$ inches, is that the resistance varies as the square of the thickness. Thus a plate 4 inches thick is found to have sixteen times the resisting power of another 1 inch thick. Laminated armour, which is a covering of several plates bolted together, was adopted in the American navy; but such plates are much weaker in proportion to the aggregate thickness of the armour than solid plates. A. P. are also employed for land fortifications, to their thickness in which case there is no neces-

sary limit. The extreme limit of naval armour does not yet appear to be reached, for Mr Barnaby has designed vessels in which he proposes the employment of plates 24 inches in thickness.

Armoury, a storehouse of military weapons, or a museum collection of specimens of arms valuable for artistic beauty or historical connection. The most famous collection of armour in the world is at Dresden; but the Tower of London also contains a very valuable collection.

Arms, the general name given to weapons of offence. Amongst the earliest of these were the bow and arrow, the sling coming perhaps next in point of antiquity. The club, sword, javelin, pike, spear, dart, lance, dagger, axe, mace, and chariot-scythe seem also to have been in use from the earliest times. The cross-bow was introduced at a later date by the Normans, and previous to the invention of gunpowder a rude artillery consisting of catapults, ballistæ, and battering-rams were used in warfare.

Till the introduction of gunpowder in the 13th c., little change had taken place in the implements of war; but that invention set men's genius to work to utilise it, and the larger sort of firearms (artillery) were brought into use early in the 14th c. Cannon were used by Edward III. in his first campaign against the Scots in 1277; and twenty years later we hear of them being used by the French at the battle of Cressy. Portable firearms, the earliest in date of which was the hand-cannon (a simple tube of iron fixed on a straight stock of wood, furnished with a touch-hole, and fired from a rest by a lighted piece of tow), were introduced into this country by Henry VI. in 1471; but it is generally believed that such A. were in use in Germany nearly half a century previously. The principal varieties of portable firearms which have been in use are the hand-cannon, arquebus, haquebut, demi-haque, musquet, matchlock, wheel-lock, currier, carbine, fusil, musketoon, blunderbuss, dragon, hand-mortar, dag, pistol, firelock, rifle, &c., nearly the whole of which are now obsolete. In connection with portable firearms, various contrivances for rendering them serviceable as weapons of offence when unloaded have from time to time been used, amongst the earliest being the 'sweynes feather' (hog's bristle), a long blade, the handle of which, being inserted into the muzzle of the gun, made a very effective weapon. About 1671 the bayonet was introduced, and at first the handle fitted into the muzzle of the piece; but subsequently a ring was added to fit over the outside of the muzzle, thus permitting of the firing of the weapon with the bayonet attached. In recent years the improvement of A. has advanced with almost inconceivable rapidity, and a mere catalogue of modern inventions would occupy a large space. The principal kinds of A., ancient and modern, will be described under their proper headings.

Arms, Assumptive. See HERALDRY.

Arms, Bells of, are tents for keeping the small-arms of each company in a regiment of infantry.

Arms, Heraldic, or **Armorial Bearings**, the badges by which, in early ages, military knights and leaders were distinguished. The badge was engraven, or otherwise represented, on the shield; hence the shield form of A. B. The practice is alluded to by Homer, and it rose into high importance at the period of the Crusades.

Arms, Messenger at. See MESSENGER-AT-ARMS.

Arms, Sergeant at. See SERGEANT-AT-ARMS.

Arms, Stand of, denotes every weapon, offensive or defensive, required for the complete equipment of an infantry or cavalry soldier.

Arm'strong, John, whose *Art of Preserving Health* (1744) was, until the commencement of the present century, esteemed one of the finest didactic poems in the language, but which is now quite, though not deservedly, forgotten, was born at Castleton, Roxburghshire, about 1709, studied medicine at Edinburgh, graduated in 1732, and settled in London as a physician in 1735. He died 7th September 1779. The four stanzas concluding the first part of Thomson's *Castle of Indolence* are A.'s. Besides other poems, he is the author of a number of medical essays.

Armstrong, John, M.D., an eminent physician and medical writer, born May 18, 1784, at Ayres Quay, near Sunderland, died December 12, 1829, at London, where he had practised for eleven years. His principal works are treatises on *Puerperal Fever* and *Typhus* (1816). His lectures on the practice of physic, delivered in London, were published in 1834 by Joseph Rix, one of his pupils.

Armstrong, Sir William George, was the son of an eminent citizen of Newcastle-on-Tyne, and was born there in 1810. He first entered the legal profession, but his unmistakable scientific bias, developed by the tastes of his father, after some years diverted him from the law. While still a practising solicitor, however, he was led to the invention of the hydro-electric machine (1842), for which he was elected, in 1846, a fellow of the Royal Society. In 1845 he invented the hydraulic crane, and in later years extended the application of hydraulic power to hoists of every kind, capstans, spring-bridges, and a host of other purposes. It was for the manufacture of such machinery that he, after having given up the less congenial profession of the law, established along with some friends the Elswick Engine-Works.

A. is especially famous, however, for his invention of a gun of most extraordinary power and precision. His attention was drawn in this direction during the Crimean war in 1854, when many inventors were producing new forms of cannon and projectile. In 1858 the Rifle Cannon Committee recommended the adoption of the A. gun (see BREECH-LOADING ARMS, CANNON, &c.), which was specially distinguished from the old pieces of ordnance in being rifled, and in having an ingenious contrivance for loading at the breech. Soon after, Mr A. presented his patent to the government, without any stipulation. He was made chief-engineer of rifled ordnance for seven years provisionally, and received the honours of C.B. and knighthood. In February 1863 Sir W. A. resigned his appointment, and re-joined the Elswick Manufacturing Company, and in the same year was elected President of the British Association. In 1862 he received from Cambridge the honorary degree of Doctor of Laws.

Army. See ANCIENT, MÆDÆVAL, MODERN ARMIES; ARMIES. Besides the main A. which conducts the great operations in the field, various subsidiary armies are employed in a war. The *Covering A.* guards the roads and passes. The *A. of Observation* watches the enemy. The *A. of Reconnaissance* ascertains the strength and position of the enemy at a special position, or generally. The *Flying A.* moves quickly, protects garrisons, and alarms the enemy when required. *Siege and Blockading Armies* may also be required.

Army Administration. The sovereign is the supreme ruler of the British army, from which it follows that the responsible ruler is a member of the Ministry for the time being. He is called the Secretary of State for War. It is his business to prepare the Army Estimates (q. v.), and to lay before Parliament any scheme which may seem to him likely to promote military efficiency and economy of administration. Questions regarding enlistment, recruiting, and promotion, and with regard to the relationship to be maintained between the Regular Forces and the Militia (q. v.) and Volunteers (q. v.), are probably the most frequent which the Secretary for War has to consider. The commander-in-chief, again, is the representative of the sovereign in matters relating to military command and discipline. Promotions and appointments in the army are ordinarily under the patronage of the commander-in-chief. See COMMANDER-IN-CHIEF.

Army Agent. See AGENT, ARMY.

Army Estimates. As the name imports, these are the estimated expenses of the army. They are made up annually in spring by the War Secretary, and submitted by him for approval to the Treasury and to the Chancellor of the Exchequer. After adjustment, they then form part of the Budget (q. v.) which the Chancellor of the Exchequer submits to Parliament. They are of course open to criticism in detail, and to amendment in Committee of the House of Commons. On the supply as granted by the House the Accountant-General of the War Office passes drafts as they are required, addressed to the Paymaster-General

of the Forces, who is authorised by the Treasury to honour them. The total A. E. for the period 1st April 1875 to 31st March 1876 was £13,488,200.

Army List is issued monthly under authority of the War Office. It gives the names of all commissioned officers in the British army, of the general and field officers of the old Indian army, of the holders of staff appointments and military honours, besides further ample military detail. Hart's *A. L.*, printed in smaller type than the above, gives even more information, but does not possess official authority.

Army Schools. There are schools in connection with the army, for giving general tuition to private soldiers and to their children, such as the Royal Military Asylum at Chelsea. There are also schools which specially train youth for military service. All candidates for the Royal Artillery and the Royal Engineers must be trained and pass their examination at the Royal Military Academy (q. v.) at Woolwich. Then there are schools for improving the military efficiency of the officers and men. The principal one of these is now—since the abolition of purchase in the army—the Royal Military College, Sandhurst. See SANDHURST, ROYAL MILITARY COLLEGE.

Arnauld, Antoine, a great French advocate, born at Paris in 1560. He was the son of A. A., counsellor of Catherine de Médicis, and was distinguished for his earnest opposition to the Jesuits, by whom he was accused, though without reasonable cause, of being a Protestant. His defence of the University of Paris in 1594 against this formidable order is the chief foundation of his reputation; but he wrote a variety of political works which were notable in their day. A. died 29th December 1619. Of his family of twenty, six daughters embraced a 'religious' life, and were the founders and mainstay of Port-Royal. The two most conspicuous were Jacqueline Marie Angèle A. (born 1591, died 1661), and Jeanne Catherine Agnès A. (died 1671).

Arnauld, Antoine, known as 'the great A.,' youngest son of the above, was born at Paris, 6th February 1612. Intended by his father for the bar, he early showed a strong bias towards the Church, with a love of scholastic theology. For the Church he accordingly studied, entering the Sorbonne as a pupil of Lescot, confessor of Cardinal Richelieu. His study of the writings of St Augustine fixed his theology for ever. In 1641 he was ordained a priest, and in 1643 he published a work entitled *De la Fréquente Communion*. On its account he was admitted 'of the Society' of the Sorbonne. The work, however, gave great offence to the Jesuits, with whom A. henceforward carried on an implacable controversy, which may be considered to have begun with his *Théologie Morale des Jésuites*, and to have closed only with his death. In 1640, on the appearance of the *Augustinus*, a posthumous work of Jansenius (q. v.), which gave rise to the great Jansenist controversy, A. defended the learned work in opposition to the Jesuits, and to Pope Urban VIII., by whom it had been condemned by Papal bull. His apologetic pamphlets, which appeared in quick succession, were *Premières et Secondes Observations*; *Considérations*; *Difficultés*; and *Apologie de Jansenius*. But piety had its charms for him as well as religious strife, and his *Mœurs de l'Eglise Catholique*; *Correction*; *Grâce*; *La Vérité de la Religion*; *De la Foi, de l'Espérance, et de la Charité*, are evidences of a noble and devout soul. Even secular literature claimed a high share in his regards. During a lull in the theological storm, he wrote his *Grammaire Générale Raisonnée, Éléments de Géométrie*, and *L'Art de Penser*. In 1649 the Jansenist controversy broke out with renewed fury, with the customary flood of polemical literature, the practical result being that in 1655 56 A. found it prudent to leave Port-Royal, being at the same time expelled from the Sorbonne and from the Faculty of Theology. But his pen was more vigorously employed than ever. Besides furnishing his friend Pascal (q. v.) with the materials for his *Provincial Letters*, he published *Cinq Écrits en faveur des Curés de Paris contre les Casuistes relâchés* (1658); *La Nouvelle Hébertie*, and *Les Illusions*, i.e., of the Jesuits (1662); *Cinq Dénonciations* (1689-90); *La Morale Pratique* (1683), and many other works. Finally, the Jesuits induced King Louis to issue an order for his arrest. He consequently was obliged to retire into Belgium (1679), where he passed the rest of his life. He died at Brussels, 8th August 1694. His works, of which there are upwards of 100 volumes, were published at

Paris, 1775-83. Socially, A. was celebrated for equanimity and gentleness. His bitter spirit of controversy doubtless resulted from an earnest love of what seemed to himself the truth, with a lack of capacity for seeing more than one side of a question; but he was beyond question a man of brilliant, versatile, and acute genius, a ripe theological scholar, and a profound metaphysician. See Sainte-Beuve's *Histoire de Port-Royal* (Paris, 1840-62).

Arnauld, Marie Angélique, a daughter of Robert A. d'Andilly, and granddaughter of Antoine A., the advocate, was born 28th November 1624. Of a resolute and strongly devotional character, at an early age she became a nun at Port-Royal des Champs. Here, when twenty-nine years old, she was made sub-prioress, an office which she continued to hold on her subsequent removal to Port-Royal de Paris. In 1640 there had appeared a posthumous work of Jansenius, Bishop of Ypres. This work laid down with Calvinistic rigour the doctrines of predestination and of the depravity of human nature. These doctrines were embraced by Marie Angélique with enthusiasm, and maintained with the heroism which they have so often inspired. Her convent was broken up by royal edict, its inmates distributed among the more orthodox convents in France, and every endeavour made by the Jesuits to induce them to recant; in vain, however, as regards Marie Angélique at least. In 1669 Pope Clement IX. endeavoured to effect a compromise between the Jansenists and the Jesuits. The nuns of Port-Royal des Champs, who had already been restored to their nunnery under restrictions, received back their privileges. Marie Angélique was again elected prioress, and in 1678 she was made abbess. To some extent persecution was revived on the death of her protectress the Duchess de Longueville. She died 29th January 1684. Her *Mémoires pour servir à la Vie de la Mère M. A. A. de Sainte Madeleine, Réformatrice de Port-Royal*, were published in 1730, and her *Conférences* in 1760.

Arnauld, Robert d'Andilly, eldest son of Antoine A., the advocate, was born at Paris in 1583. For some time he was a man of considerable consequence at the French court, but at the age of fifty-five he retired from the world, and devoted himself to religious history and biography. He died 27th September 1674. His daughter, Marie Angélique (q. v.), is more famous than himself.

Arnd, Johann, a Protestant divine, born at Ballenstädt, Anhalt, 27th December 1555; died at Celle, Hanover, 11th May 1621. His *Wahres Christenthum* ('True Christianity'), still popular in Germany, had at one time a European reputation. An English version by W. Jacques, in 2 vols., was published at London in 1815. A. was tinged with mysticism, but the aim of his work is to promote practical religion. He wrote several other works, none of which are now much read.

Arndt, Ernst Moritz, a German patriot and martial lyricist, was born in the island of Rügen, December 26, 1769. He was made Professor of History at Greifswald in 1800, but had to take refuge in Sweden after the fatal battle of Jena, having made himself conspicuous as the author of the *Geist der Zeit* ('Spirit of the Time,' Altona, 1806). On his return in 1810 he actively supported the minister Von Stein, and by his many writings and songs did much to fire the German patriotism. An interesting work relating to this period is his *Wanderungen und Wanderungen mit dem Reichsfreiherrn von Stein* (2d ed. 1858). His song, *What is the German Fatherland?* may be termed the national hymn of Germany. A. was appointed to the chair of history at Bonn in 1818, but was actually suspended till 1840, for 'demagogic' tendencies. In 1848 he was made a member of the German Parliament, at once joined the national party, and seceded with Gagern (q. v.) in 1849. He died January 29, 1860. His *Gedichte* were published in a collected form at Frankfurt, 1818 (new ed. Berl. 1860). See *Life of A.* by Baur (2d ed. 1862), and by Schenkel (6th ed. 1868).

Arne, Thomas Augustine, Mus. Doc., a famous English composer, was born in 1710. In 1733 he produced his first opera, *Rosamond*, which was received with universal applause. His other compositions include two oratorios, *Zara* and *Judith*; the operas of *Eliza* and *Artaxerxes*; a comic operetta, *Tom Thum*; *Comus*; and *The Masque of Alfred*, in which the

national air *Rule Britannia* first appeared. A. died in 1778. His son Michael inherited much of his talent, and set several operas to music.

Arnee', or **Arna** (*Bos Arnae*), a species or variety of ox inhabiting India, and forming the largest member of that family (*Bovidae*). Some naturalists regard it as a variety of the buffalo. The horns are very large, measuring, in some cases, 6 feet each along the outer or greater curve.

Arn'hem, the *Arenacum* of the Romans, and the *Arnolds Villa* of the middle ages, is the capital of Guelderland, Holland, on the Rhine (Lek), here spanned by a bridge of boats. It is strongly fortified, stands at the foot of a slight range of hills, in a healthy locality, and has an active transit trade with Germany. A. is connected by railway with Amsterdam, Rotterdam, Zutphen, &c. It has the most picturesque situation of any town in Holland, and is a favourite residence of Dutch E. India merchants when they come home. Here Sir Philip Sidney expired (7th October 1586), after being mortally wounded at the battle of Zutphen. In 1813 the Prussians took A. from the French. Pop. (1870) 33,081.

Arnica, a genus of Dicotyledonous plants of the order *Compositae*. *A. montana* is the mountain tobacco of the French. The plant has acrid properties; at one time was extensively employed on the Continent as a stimulant in fever, ague, and palsy. A tincture prepared from the plant was applied externally to fresh wounds and bruises, which promoted their speedy healing. The plant has now fallen into neglect, and in Germany has received the name of *Panacea lapsorum*.

Arnim, the name of a very ancient and noble German family, which professes to derive its origin from the town of Arnheim, in Holland, as far back as the 10th c., but whose historical distinction properly begins with a Heinrich von A. in 1280. The family gradually acquired extensive possessions in the Uckermark, the Altmark, the Magdeburg region, Pomerania, E. Prussia, Silesia, Saxony, Bavaria, Hanover, Mecklenburg, &c., and divided into two main lines, Biesenthal and Zehdenik, each of which has several subdivisions.

Arnim, Bettina von, sister of the rhapsodical novelist Clemens Brentano, and wife of Ludwig Achim von A. (q. v.), was born at Frankfurt-on-the-Main, 4th April 1785. She wrote several fantastic stories, and is best known as the romantic and charming correspondent of Goethe, as seen in Goethe's *Briefwechsel mit einem Kinde* ('Correspondence with a Child'), published in 1835. She died at Berlin, 20th January 1859. Of her daughters, *Gisela von A.*, married to Hermann Grimm, is known by her *Dramatische Werke* (2 vols. Bonn, 1857).

Arnim, Harry Count von, a member of the A. family, was born at Moitzelfitz, in Pomerania, in 1824, entered the service of the Prussian State 1847, and commenced his diplomatic career in 1851, when he was named secretary of legation, in which capacity he resided successively at Rome, Cassel, and Vienna. In 1862 he was appointed minister at Lisbon, created count in 1870, and in 1871, by imperial decree, minister extraordinary to the French Republic, and some time after raised to the rank of ambassador. Here he opposed the ecclesiastical policy of the German chancellor, and involved himself in such antagonism to his chief that his diplomatic career ended in one of the most remarkable state trials of late years. Recalled from Paris, 2d March 1874, he was left unemployed by the government. Irritated, it is supposed, by his humiliation and neglect, he made certain revelations to the public (2d April 1874) in the Vienna press relating to the policy of the Papal court. The discovery was then made that a large number of state papers had been taken from the archives at Paris during A.'s term of office, and failing to give a satisfactory account of them, he was arrested, 4th October 1874. He was tried by the Tribunal of the city of Berlin (9th to 15th December), found guilty of removing public documents, and sentenced to three months' imprisonment. An appeal was made to the Kammergericht, which on the 25th June 1875 found A. guilty of removing state papers from the Paris Embassy, which he subsequently refused to give up, and sentenced him to nine months' imprisonment. See *Le Procès d'Arnim* by MM. Figurey and Corbier (Paris, 1875).

Arnim, Karl Otto Ludwig von, a distinguished traveller, born at Berlin, 1st August 1779, well known as the author of *Flüchtige Bemerkungen eines flüchtigen Reisenden* ('Passing Notes by a Passing Traveller,' 6 vols. Berl. 1837-50), a narrative of his wanderings in Europe, marked by clearness and purity of style. He is also the author of several poems and translations. A. died at Berlin, February 9, 1861.

Arnim, Ludwig Joachim, usually **Achim von**, a German novelist, was born at Berlin, Jan. 26, 1781. He assisted Clemens Brentano in editing the *Wunderhorn*, a book of ballads (1806). In 1810 appeared his best-known romance, *Armuth, Reichthum, Schuld, und Busse der Gräfin Dolores* ('The Poverty, Wealth, Guilt, and Penance of the Countess Dolores'), which was greatly praised by Jean Paul. His works show imaginative, or at least fantastic, power, but are marred by tedious reflections, and a confusion of fact and fancy. A. died at Dahme, near Berlin, January 21, 1831. His *Sämmtliche Werke* ('Collected Works') were published by W. Grimm (19 vols. Berl. 1839-46).

Arno (anc. *Arnus*), an important river in Tuscany, Central Italy, rises on the S. slope of Monte Falterona, a western peak of the Apennines, about 30 miles W. of Florence. It runs S. through the long deep valley of Casentino, sweeps W. into the fertile plain of Arezzo, and here receives the Chiana; it then flows N. for 14 miles, through the Valdarno, 'where the Etrurian shades high over-arch imbower;' is joined by the Sieve, and abruptly turns its course W. to the Mediterranean. The A. passes Florence and Empoli, and enters the sea 5 miles below Pisa. It has a course of 140 miles, and is subject to sudden inundations.

Arnold, or Arnald, of Brescia (in Lat. *Arnaldus, Arnolphus, Arnulphus Brixienensis*), a monk trained under Abelard, and famous for his eloquence, preached against the corruption of the clergy, which all contemporary evidence attests was then at its worst, and excited disturbances over a great part of Italy in the early part of the 12th c. Banished by the second Lateran Council (1139), he retired to France, whence the irreconcilable enmity of St Bernard drove him to take refuge in Zürich. The spread of his doctrines having excited an insurrection at Rome, A. repaired thither, and attempted to introduce a republic, but for ten years there was continual disorder. Pope Lucius II. was killed by the populace in 1145; Eugenius III. escaped to France, but Adrian IV. restored order by excommunicating the city (1154). In 1155, on the coronation of the emperor, Frederick I., at Rome, A. was crucified, his body burnt, and its ashes thrown into the Tiber. St Bernard, who persecuted him, admits the purity of his life, and explains his singular abstinence from all carnal pleasures by the amiable hypothesis that, 'like the devil, he thirsted only for the blood of souls.' See Francke's *Arnold von Brescia* (Zür. 1825).

Arnold, Matthew, an exquisitely critical English author, eldest son of the late Dr. Arnold of Rugby, was born December 24, 1822. He was educated at Rugby and Winchester. In 1857 he was elected Professor of Poetry at Oxford. In 1859-60 he was sent by the British Government as assistant to the Commission to inquire into the state of education in France, Germany, and Holland. His early writings were poetical, showing delicacy of finish and a rare classical feeling. The chief of these are *Poems* (1853; 3d ed. 1877); *Merope*, a tragedy on a Greek model (1858); and *New Poems* (1867). In recent years he has written many prose works, as *Lectures on Translating Homer* (1861), *Essays in Criticism* (1865), and *Lectures on the Celtic Literature* (1867). His chief writings on education and other social subjects are a *Report on Education in France, Germany, and Holland* (1861); *A French Eton or Middle-Class Education and the State* (1864); *Schools and Universities of the Continent* (1868); *Culture and Anarchy, an Essay in Political and Social Criticism* (1869); *Higher Schools and Universities in Germany* (1874); and *Mixed Essays* (1879). His treatment of such subjects is at once subtle and trenchant, and animated by an intense disdain of insolent stupidity and vulgar pretence. In his *St. Paul and Protestantism* (1870), and *Literature and Dogma* (1872), he has developed a system of literary criticism as applied to religion marked by a singular freedom and incisiveness.

Arnold, Thomas, D.D., the greatest schoolmaster of modern

times, was born at W. Cowes, Isle of Wight, June 13, 1795. He was educated successively at Warminster and Winchester schools, and in 1811 entered Corpus Christi College, Oxford. His university career was auspicious, and he formed friendships with such men as Keble, Whately, and Justice Coleridge, which lasted through life. In 1818 he was ordained deacon at Oxford; in 1819 he settled at Laleham, near Staines; and in 1820 he married Mary, youngest daughter of the Rev. John Penrose, rector of Fledborough. At Laleham he remained for nine years, taking seven or eight private pupils in preparation for the universities. Here he employed himself chiefly on a lexicon of Thucydides, and an edition of that author; and here he first became acquainted with Niebuhr's *History of Rome*, on a perusal of which he determined to delay any work of his own till he had further studied this new field of inquiry. In 1827 he was elected to the head-mastership of Rugby, and in 1828 entered on that distinguished career of educational reform and administration by which he changed the face of education throughout the public schools of England. His theory of education may best be gathered from his own words: 'If there be anything on earth which is truly admirable, it is to see God's wisdom blessing an inferiority of natural powers, where they have been honestly, truly, and zealously cultivated.' 'It is not knowledge, but the means of gaining knowledge, that I have to teach.' He placed implicit confidence in a boy's assertion, so that there grew up a general feeling 'that it was a shame to tell A. a lie—he always believes one.' He 'kept punishment in the background as much as possible, and by kindness and encouragement attracted the good and noble feelings of those with whom he had to deal.' 'Till a man learns that the first, second, and third duty of a schoolmaster is to get rid of unpromising subjects, a great public school will never be what it might be, and what it ought to be.' 'It is not necessary that this should be a school of 300, or 100, or 50 boys; but it is necessary that it should be a school of Christian gentlemen.' A. took a warm interest and an active part in the political and theological discussions of the stirring period in which he lived. In politics he was a Whig: 'There is nothing so revolutionary, because there is nothing so unnatural and so convulsive to society, as the strain to keep things fixed, when all the world is by the very law of its creation in eternal progress.' A. was an earnest advocate of the belief that Church and State are identical, and that there is no Christian priesthood as distinct from a Christian laity. He died suddenly at Fox How, near Ambleside, July 12, 1842. He published five volumes of sermons, a *History of Rome*, and an edition of Thucydides, besides numerous pamphlets. His *Life and Correspondence*, by his favourite pupil, Mr (now Dean) Stanley, appeared in 1844; and Mr Hughes, another Rugbeian, has given us, in *Tom Brown's School-Days*, a graphic picture of Rugby in A.'s time.

Arnott, Neil, M.D., F.R.S., &c., a distinguished physician of the present century, was born at Arbroath in 1788. On completing his medical course at Aberdeen, he went to London in 1806, and after some experience in the navy, started practice in the metropolis in 1811, where he died March 2, 1874. A.'s principal works are *Elements of Physics* (1827), treating of natural philosophy in its bearing upon medicine; and a *Survey of Human Progress* (1861). In 1867 he gave to each of the Scottish universities £1000 for prizes, in order to promote the study of natural philosophy among medical students; and to the London University £2000, for the foundation of a scientific scholarship.

Arnott's. See ANOTTO.

Arnsberg, an important district of the province of Westphalia (q. v.), Prussia, forming part of the highlands of the Lower Rhine; area, 2900 sq. miles; pop. 791,360. It is rich in coal, iron, lead, and silver; and there are numerous factories and mills, owing to the abundant water-power, but only in a few valleys is the surface arable. The capital is A., on the Rhur, with manufactures of linen, broadcloth, and potash; pop. 4784. The court of the Holy Fehme (see FEMGERICHTE) used to be held here.

Arnstadt, the chief town in the upper part of the principality of Schwarzburg-Sondershausen, on the Gera, 13 miles S.W. of Gotha. It is one of the oldest of the Thuringian towns, its history going back to the beginning of the 8th c., and has

considerable manufactures, chiefly in gloves, pottery, beer, and paper. Near it are extensive copper and salt mines. Pop. (1871) 8603. Its history, ancient and modern, is recorded in Hesse's *A.'s Vorseit und Gegenwart* (Arnst. 1842).

Arokszell's, a town in Hungary, 44 miles N.E. of Pesth, an entrepôt for the trade between Upper Hungary and Pesth, and the centre of a rich agricultural and grazing district. Pop. (1869) 8170.

Aromatics, substances which are possessed of an agreeable odour, and are prized on that account. Many of them are the sources of perfumery, and will be treated of under that head; but there are other substances, the odours of which are too faint or fugitive to be capable of extraction or application as perfumes. Aroma or any form of smell is given off by substances in a state of exceedingly minute gaseous subdivision, and it has been calculated that the human nose is capable of perceiving the odour of one thirteen-millionth part of a grain of oil of resin, and a much smaller proportion of musk. Only such bodies as are energetically acted on by oxygen give off odour, such gases as nitrogen and hydrogen, which mingle without combining, being inodorous. In chemistry, benzoic acid, and a series of its homologues, are termed the aromatic series.

Aromatic Vinegar is a perfume compounded of strong acetic acid and various essences, according to the taste of the perfumer. The pungency of the acetic acid, combined with fragrance of the perfumes, makes A. V. a refreshing and stimulating preparation of great value in case of headaches, and in the sick-room generally. Originally it came into repute as a prophylactic in infectious disease; and the 'four thieves' vinegar' (*vinaigre des quatre voleurs*), a complex preparation containing with the acetic acid wormwood, rosemary, sage, mint, rue, lavender, spices, camphor, alcohol, &c., is said to have enabled four persons to attend and rob a multitude of individuals at Marseille, sick and dead from the plague, without themselves being affected.

Aronia, the name given to a species of hawthorn. See CRATÆGUS.

Ar'pad, the first Grand-Duke of the Magyars, and founder of the kingdom of Hungary, was born about 870. Leo the Wise, Emperor of Constantinople, obtained his aid against the Bulgarians, and Arnulf, Emperor of Germany, against the Moravians (892). About 894 he appeared in force on the Carpathians, and by a series of conquests took possession of the land far beyond the Theiss, then in the possession of Slaves, Bulgarians, Walachians, and others. Juhutum, his chief captain, conquered Transylvania. A. himself was more a statesman than a mere soldier, and showed great prudence and sagacity in organising a settled government in his new dominions. In 899 he conquered the region between the Danube and the Drave. The Magyars comprised seven great clans, subdivided into houses, and the Constitution was based on these distinctions till King Stephen, by the establishment of a monarchy, broke their power. A. died in 907. The A. dynasty expired with Andreas III. in 1301, but its founder is still the hero of Hungarian ballad and romance. See the *Codex Anonymus*, in Schwandtner's *Scriptores Historie Hungarice* (1746), and Endlicher's edition (Vien. 1827).

Arpeggio (Ital.), a musical term, denoting that the notes forming the chord so marked are to be played in rapid succession, beginning with the lowest.

Arpi'no (anc. *Arpinum*), a town in the province of Caserta (Terra di Lavoro), S. Italy, midway between Rome and Naples, and about 65 miles from each. It was the birthplace of Cicero and Caius Marius, and in 188 B.C. obtained the Roman franchise. A. has a beautiful situation on the slope of a rugged hill, 6 miles W. of the river Garigliano, and near it are rich marble quarries and iron mines. It has considerable manufactures of woollens, parchment, paper, and leather. Pop. 12,648.

Ar'qua, a village in the province of Padua, N. Italy, among the Euganean Hills. Pop. 1200. Petrarch died here, July 18, 1374; his furniture is still preserved, and his grave is marked in the churchyard by a red marble monument. The house in which he lived was presented to the municipality of Padua by Cardinal Silvestri in July 1875.

Ar'quebus, or **Harquebus** (from the German *Hack-buss*, a cannon with catch), is frequently loosely applied to different portable firearms of the 15th and 16th centuries. The appellation specially belongs to a firearm which was provided with a match-holder, trigger, and tumbler, and was invented in the second half of the 15th c. With a barrel a little over a yard in length, it admitted of a steady aim being taken—in this respect excelling all previous hand-guns. The musket of the same period is often confounded with the A.; the only difference between them lay in the former having a calibre twice as large as the latter. The double A. had two match-holders, and a longer barrel; in some cases so long as 7 feet, necessitating the use of a support. It was chiefly employed to defend ramparts. Other arquebuses of later invention are distinguished in name by the mechanism of the lock, as the snapshance-lock and wheel-lock A. The foot soldiers armed with these weapons were called arquebusiers.

Arracach'a, the name given by the natives in some parts of S. America to tuberous-rooted plants, and applied by botanists to a genus of Umbelliferous plants. *A. esculenta* is cultivated for its roots, which form a large proportion of the winter food of the people of Columbia and other parts of S. America. A fermented liquor is made from these roots, and an ardent spirit by distillation. The plant will not thrive in Britain, as has been proved by experiment.

Arrack, or **Baki**, a name for distilled liquors in India, Ceylon, Siam, and the Malayan Archipelago. The forms *Araca* and *Araki* are also used in other parts of the East. One of the chief sources of A. is the sweet sap of palm-trees, especially the coconut palm (*Cocos nucifera*), and the palmyra palm (*Borassus flabelliformis*). This juice is procured by binding the spathes which surround the young flowers, and afterwards wounding them, to facilitate the flow of the sap into earthen chatties, which are attached to the spathes. The sap on fermenting is called *toddy*, and yields A. on distillation. The distillation of toddy is extensively pursued at Goa and Colombo; and it has been estimated that in Ceylon alone, one-fourth (about 5,000,000) of the entire cocoa-nut trees of the island are devoted to the drawing of toddy, of which the greater part is distilled for A., the residue being boiled down to obtain jaggery or palm sugar. In rice-growing countries A. is distilled from a fermented infusion of that grain; and in Java and the neighbouring islands molasses and toddy are added. In one Javanese method the ingredients are employed in the following proportion: Thirty-five parts of glutinous rice, sixty-two parts of molasses, and three parts of toddy, which yield on distillation twenty-three and a half parts of proof A.

Arr'ah, a town of British India, province of Behar, and district of Shahabad, 25 miles W. of Dinapore, has a pop. (1872) of 39,386. It is notable in connection with the mutiny of 1857, when an isolated house was defended for seven days, from 27th July to 2d August, by twenty white civilians, aided by fifty Sikhs, against 3000 Sepoys, who finally withdrew.

Arraign'ment, a term in the criminal law of England, signifying the calling of a prisoner by name to the bar of the court, to answer the charge against him. Unless there is apparent danger of escape, the prisoner is produced without bonds. He holds up his hand, by doing which he is held to admit himself to be the person indicted. The indictment is read to him, and the question put, 'Guilty or not guilty?' If he plead 'Guilty,' judgment is then pronounced. If he plead 'Not guilty,' the jury is sworn, and the trial proceeds. Refusal to answer is held equivalent to pleading 'Not guilty.' In Scotch law the whole form of procedure by which a person accused of a crime is brought to trial is included in the term *Criminal Prosecution* (q. v.). The special branch of procedure corresponding to A. in England is termed *Calling the Diet*. On the day fixed (see INDICTMENT, CRIMINAL LETTERS), the accused and the prosecutor, whether public or private, must appear in court, the Lord Advocate having the privilege of appearing by deputy. If the prisoner pleads 'Guilty,' the court passes sentence. If he pleads 'Not guilty,' the case is submitted to a jury. See PLEA OF PANEL, VERDICT.

Arr'an (Gael. the 'lofty isle'), in Buteshire, an island in the Firth of Clyde, 20 miles long and 12 broad, with an area of 165

sq. miles. It is separated on the E. from Ayrshire by the Firth of Clyde, and on the W. from Cantire by Kilbrannan Sound. The surface in the N. and N.W. is mountainous, and the general aspect is grandly alpine. The highest elevation is Goatfell, an English corruption of the Gaelic *Gaoth-cann*, 'Windy Mountain,' 2865 feet. At its base lie Glen Rosa, Glen Sannox, and the beautiful bay of Brodick, on the southern shore of which is the village of Invercloy, with a spacious hotel. Brodick Castle, a seat of the Duke of Hamilton, proprietor of nearly the whole of the island, overlooks the bay from the N.E. Lamlash Bay, further S., is the safest and most capacious roadstead in the Clyde, sheltered on the E. by the huge rock called the 'Holy Isle.' Kildonan Castle, at the S.E. extremity, is opposite the isle of Pladda, on which a lighthouse has been erected; and 'King's Cove,' a cavern in the cliffs of the S.W. coast, was (according to local tradition) a hiding-place of Robert the Bruce. In the N. end is Loch Ranza, with a castle, once a royal residence. A. offers a richer field to the geologist than any district of equal extent in Britain. Devonian sandstone occupies the S.E. portion, trap and carboniferous strata the middle and W., granite and mica-slate the N.W., and the Lower Silurian rocks the N.E. and S. A. is a favourite summer resort, and numerous steamers ply between it and ports on the Clyde. Pop. (1871) 5234. See *Arran and other Clyde Islands*, by Dr James Bryce (Lond. 1875); and *Arran: Its Topography, Natural History, and Antiquities*, by the Landsboroughs (new ed., Guthrie, Ardrossan, 1875).

Arr'an, South Isles of, are three islets near the entrance to Galway Bay, on the W. coast of Ireland. The largest is Inishmore (the 'Great Isle'), 7 miles long and 2 broad; the other two are named Inishman ('Middle Isle') and Inishere. Total area, 11,287 acres; pop. (1871) 3050, of whom all but 57 are Roman Catholic. Inishmore has 2122 inhabitants, and is much visited on account of its monastic relics. Formerly twenty churches and monasteries were scattered over these islands, and Inishmore is still called 'A. of the Saints' (*Aran-na-naomh*). They also contain the remains of nine huge fortresses of rough, uncemented stones, said to have been built in the 1st c. by the Fir-Bolgs (q. v.), on being driven from the mainland. Fishing is the chief occupation, and the *coracle*, or basket skiff, is still in use here. The soil of the islands is mostly under rye, oats, and potatoes; but the summer drought often brings famine.

Arras, the capital of the department of Pas-de-Calais, lies on a slight elevation at the confluence of the river Scarpe with its branch the Crinchon. It is divided into four portions, the city, the upper and lower town, and the citadel, built by Vauban. A. was capital of the old province of Artois, and has been the seat of a bishop since 390 A.D. Its fine Gothic Cathedral of Notre Dame was built 1780, for the meeting of the States or local parliament. A., the *Nemetacum* of the Romans, was the capital of the *Atrebates*, a Belgic people, whose name it afterwards took, *Atrebate*, which has been gradually corrupted into A. Along with the county of Artois, it formed part of Lower Burgundy, and—except for a short time, when Louis XI. seized it—remained in the hands of the Austro-Spanish successors of Charles the Bold till 1640, when it surrendered to Richelieu. Since then it has always been a French town. A. is the birthplace of Robespierre, and during the first revolution it was domineered over by the worst Terrorists of the time. The town was famous during the middle ages for its pictured tapestry, which, in fact, was called A. in England. It has now considerable manufactures in iron-ware, woollen and cotton goods, lace, pottery, and leather; its trade is chiefly in corn, flour, oil, wine, and brandy. An important corn-market is held here. Pop. (1872) 21,447.

Arrest', an English law term in criminal and civil procedure. Criminal A. has been considered under *Apprehend* (q. v.). Civil A. means the apprehending or restraining a person in execution of the command of a court, or by an officer of justice. The A. of debtors, against whom there is a presumption of intention to abscond, is now regulated by the Bankruptcy Act, 1869, and the Absconding Debtors Act of 1870. The latter provides that the Court of Bankruptcy may, by warrant addressed to any constable or prescribed officer of court, cause a debtor to be arrested and safely kept, if, after a debtor's summons has been granted according to the Act of 1869, and before a petition of bankruptcy can be presented against him, it appears to the court that there is reason to suppose that he intends to go abroad to avoid paying the debt, or to avoid or embarrass procedure in

bankruptcy. The debtor may, however, apply to the court to dismiss the summons, or he may pay, secure, or compound the debt within time provided by the Act, without being held to have committed an act of bankruptcy. Under the Act of 1869 imprisonment for debt is abolished except in special cases. See **DEBTORS AND CREDITORS**. There are classes exempted by privilege from A. Diplomatic representatives of foreign courts are; so also are English, Scotch, and Irish peers, members of Parliament, and all persons connected with a cause before a court of justice. See **ARRESTMENT, ARRESTMENT FOR FOUNDING JURISDICTION**.

Arrest' of Judgment, the procedure in English law so termed is regulated by the Common Law Procedure Act of 1852. After the jury have given their verdict, follows the *Judgment* of the court. But judgment may be suspended or arrested where there has been any defect in the procedure, for it cannot be entered until the next term after trial, and upon notice to the other party. Causes for suspending judgment, by granting a *new trial*, may arise for want of due notice of trial, improper behaviour of the jury among themselves, or of the plaintiff towards them, by which their verdict is influenced; misdirection of the judge, or exorbitant damages. A. of J. may be made for good cause in criminal as well as in civil cases. In the Scotch criminal courts, when the prosecutor moves for sentence, the prisoner may propose reason in arrest. But no objection to the indictment or admitted proof will be heard.

Arrestment is, in the law of Scotland, the term for the procedure by which a debtor in a personal obligation is restrained from paying his creditor until a debt due by that creditor is paid or secured to the arrestee. The A. does not, however, transfer the debt. To do this, there must be a decree in the arrester's favour under an 'Action of Forthcoming,' which may be sued under either the supreme or inferior courts. The corresponding term in English law is **ATTACHMENT** (q. v.).

Arrestment for Founding Jurisdiction, or, as it is usually called in Scotch law, *Jurisdictionis Fundandæ Causa*, is a legal procedure in Scotland for bringing a foreigner under the jurisdiction of its courts. This can only be done when the foreigner has real or personal property in Scotland. In the former case arrestment is not required, as he is held to have a *forum*, and merely requires to be cited as out of the kingdom. In the latter event, however, the process in question is necessary. It is held to give the court jurisdiction both over the property arrested and its owner. The principle involved has been affirmed by the House of Lords.

Arrestment of Wages. With a view to prevent the hurtful effects produced among some of the working classes in Scotland, from credit given them by dealers in respect of their power of A. of W., the Act 33 and 34 Vict. c. 63, was passed. It exempts from arrestment earnings not exceeding 20s. per week, and prohibits their arrestment under small-debt summonses; that is, for debts under £12. In England, with one or two exceptional cases, wages cannot be arrested for debt.

Arrhenatherum, a genus of grasses. *A. avenaceum*, or oat-grass, is a British species, and grown along with others as a meadow-grass. On the Continent it is cultivated for fodder, and sometimes called French rye-grass. Its nutritive qualities, however, are low compared with some other grasses.

Arrianus, Flavius, a philosopher and historian, was born at Nicomedia, in Bithynia, about 100 A.D. He was a follower of the great Stoic Epictetus, and from a desire to be to him what Xenophon had been to Socrates he published the life, conversations, and lectures of his master, and also the famous *Manual of Epictetus*. His most important work is his account of the Asiatic expedition (*Anabasis*) of Alexander the Great, which we have complete with the exception of one gap in vii. 12. The work is of great value, A.'s tone being sober and practical, and his judgment discreet. He also wrote on the Chase, on India, on his voyage round the Euxine, and on Tactics. In A.D. 124 he gained the favour of the Emperor Hadrian in Greece, and from his hands received the honour of the broad purple. A. was appointed (A.D. 136) Prefect of Cappadocia. He died in the reign of M. Aurelius. The best editions of the *Anabasis* of A. are those by Ellendt (Regim. 2 vols. 1832), and Krüger (Berl. 1835).

Arroba, a Spanish and Portuguese weight equal to about an English quarter of a cwt., and in the former country a measure for liquids, varying, however, in the different provinces

The Castilian A. (*A. mayor de vino*) contains about three and a half English gallons.

Arrondissement (from the French *arrondir*, to make round), a subdivision of a French Department (q. v.).

Arrow. See BOW AND ARROW.

Arrowhead, the English name for *Sagittaria sagittifolia*, a handsome aquatic plant with arrow-shaped leaves found in Britain, belonging to the natural order *Alismaceæ*. It is also found throughout Europe, in Northern Asia, and some parts of India. A variety of the plant, regarded by some as a species (*A. Sinensis*), is cultivated extensively by the Chinese for its corms, which constitute an article of food. Several other species are also cultivated for the same purpose in warm countries.

Arrow-headed Characters. See CUNEIFORM INSCRIPTIONS.

Arrow-heads. See FLINT ARROW-HEADS.

Arrowroot, the general name for a pure kind of starch obtained from various plants in different countries, and being



Arrowroot (*Maranta arundinacea*).

very digestible and nutritive, is largely used for dietary purposes. W. Indian A. is remarkably pure, and is obtained from the rhizomes of *Maranta arundinacea*; that from Bermuda is regarded as the best. Brazilian A., or tapioca-meal, is obtained from the roots of *Manihot utilisima*, a plant belonging to the order *Euphorbiaceæ*. Chinese A., from the tubers of *Nelumbium speciosum*, an aquatic plant. E. Indian A., from *Curcuma angustifolia*; and English A. is the starch of the common potato tuber *Solanum tuberosum*. Oswego A. is obtained from *Zea Mays*, or Indian corn. A fine kind of A., called *Tor-ses-mois*, is obtained from *Canna edulis* in the W. Indies. *Tacca pinnatifida* furnishes A. in the South Sea Islands, and *Arum maculatum* yields what is called Portland A., or sago. The name A. is applied to the produce of various plants, but it is generally associated with that of *Maranta* (q. v.), which belongs to the order *Marantaceæ*. The annual imports of A. into Britain are very large: in 1874 they amounted to over 400 tons.

Arrowsmith, Aaron, a celebrated geographer and constructor of maps, was born at Winston, Durham, July 14, 1750. At an early age he had to face the world, and in 1769 we find him in London in the employment of Cary, for whose large county maps he soon became the principal draughtsman. In 1790-98 he published his large map of the world on Mercator's projection, which greatly surpassed everything else that had yet been produced for clearness, accuracy, and excellence of engraving. He published altogether more than a hundred maps, all of the same admirable quality, the chief of which are the *Germany* (1813, seven sheets), *Turkey in Europe* (1801), *Asia* (1801, four sheets), and *United States of America* (1796, four sheets). He also wrote *A Companion to a Map of the World* (1814), *A Memoir relative to the Construction of a Map of Scotland* (1807), and a work on the *Geometrical Projection of Maps* (1825). Many of A.'s maps were reproduced in Paris by H. Langlois. He died in London, April 23, 1823.

Arrowsmith, John, a Puritan divine, born at Gateshead, Newcastle, March 29, 1602, was educated at St John's College, Cambridge. After some years' residence as a fellow of Catherine Hall, he settled at Lynn, in Norfolk, and in the great rebellion was appointed a member of the Westminster Assembly of Divines, in which capacity he took an active part in drawing up the 'Catechism.' He was a preacher for some time at St Martin's, Ironmonger Lane, London, and subsequently held the respective posts of Master of St John's College, Vice-Chancellor of the University of Cambridge, Regius Professor of Divinity and Master of Trinity College. The principal of his works, which are chiefly polemical, are *Tactica Sacra, sive de Militie*

Spirituali Pugnante, Vincente, et Triumphante Dissertatio (Camb. 1665, Amst. 1700); *A Chain of Principles* (1622); *Theanthropos* (1660). He died in February 1658-59.

Arroyo Molinos, a village of Estremadura, Spain, famous for a brilliant victory gained by Lord Hill over a French force under General Girard, October 28, 1811, in which 1300 prisoners were taken.

Arru Islands, a group of over thirty islands, about 80 miles S.W. of New Guinea, stretching from 5° 20' to 6° 55' S. lat., and from 134° 10' to 134° 45' E. long. The largest is 70 miles long and 20 broad. They are inhabited by a mixed race of Malays and Melanesians; and at Dobbo, on the island of Warud, there is a settlement chiefly of Chinese and Dutch merchants. The exports are pearls, mother-of-pearl, tortoise-shell, trepang, and aromatic bark.

Arsacidae, the name of the dynasty of kings who wrested Parthia from the grip of the Seleucidae, and founded an Eastern empire that lasted for nearly 500 years. This dynasty takes its name and its origin from *Arsaces I.*, whose history is somewhat obscure. He was probably of Scythian origin, and according to one account satrap of Bactria at the date of his invasion and conquest of Parthia (B.C. 256 or 250). He was succeeded by his brother *Arsaces II.*, *Tridates*, who reigned thirty-seven years, and strengthened the Parthian power by his decisive victory (B.C. 238) over the Syrian king Seleucus Callinicus. He was followed by *Arsaces III.*, *Artabanus I.* (died B.C. 196); *Arsaces IV.*, *Phriapatius* (died B.C. 181); and *Arsaces V.*, *Phraates I.* (died B.C. 144), who, though he had several sons, left the government to his brother *Arsaces VI.*, *Mithridates I.* (died B.C. 136.) Mithridates was a man of splendid military genius, subdued the whole region between the Indus and the Euphrates, and made the Parthian empire alike famous and formidable. His son, *Arsaces VII.*, *Phraates II.* (died B.C. 127), by his victory (B.C. 138) over Antiochus Sidetes, freed the Parthians for ever from the attacks of the Syrian kings. About this time, however, commenced those fierce wars with the nomadic races of the interior which were only ended by the repeated victories of *Arsaces IX.*, *Mithridates II.* (died B.C. 87), who has in history the surname of 'the Great.' He had a powerful rival in Tigranes, first king of Armenia, and in the year B.C. 92 first came into relation with the Romans, whose alliance he sought and obtained. After the overthrow of the kingdom of Pontus (B.C. 69), which occurred in the reign of *Arsaces XII.*, *Phraates III.*, the Roman and Parthian frontiers touched each other, and this furnished the occasion for frequent strife between the two powers. The first Romano-Parthian war was conducted by Crassus against *Arsaces XIV.*, *Orodes I.* (died B.C. 37), which was quickly followed by a second, in which Antonius was opposed by *Arsaces XV.*, *Phraates IV.* (died A.D. 4). Of the later A., *Arsaces XXIII.*, *Vologeses I.* (died A.D. 90), was unsuccessful in a war against the Romans (A.D. 56-64) for the possession of Armenia; *Arsaces XXV.*, *Chosroes I.* (died A.D. 121), lost Mesopotamia and Assyria in the reign of Trajan, but recovered them in that of Adrian; *Arsaces XXVIII.*, *Vologeses III.* (died A.D. 192), and *Arsaces XXIX.*, *Vologeses IV.* (died A.D. 209), successively warred against the Romans, the former against L. Verus, the latter against Severus. The last of the A., *Arsaces XXXI.*, *Artabanus IV.*, was finally defeated and slain by Artaxerxes (Ardashir) son of Sassan, founder of a new Persian or native dynasty, the *Sassanide* (q. v.), A.D. 226. See *Vaillant's Arsacidarum Imperium* (2 vols. Paris, 1725), *Richter's Histor. Krit. Versuch über die Arsaciden und Sassaniden Dynastie* (Gött. 1804), and *Longpérier's Sur les Monnaies des Rois Arsacides* (Paris, 1854).

Arsenal is a magazine for naval or military arms, ammunition, and equipments, sometimes combining with this character that of a manufactory. Brest, Toulon, L'Orient, and Cherbourg are the great French arsenals; but though Portsmouth, Plymouth, Deptford, and Sheerness may be regarded as storehouses for naval clothing and provisions, Woolwich is the only place in Britain which really deserves the name, as it is not only a naval and military magazine, but also a place possessing foundries and laboratories for the manufacture and final fitting up of almost every kind of arms and ammunition. See WOOLWICH.

Arsenic, or **Arsenicum**. Some of the compounds of this element were known to the ancients, and are spoken of by Dioscorides and Aristotle. A. was also studied by the early

alchemists. Schroeder, in 1694, was the first, however, to isolate A.; and its properties were subsequently studied by Brandt, Davy, Berzelius, Bunsen, and others. It occurs sometimes in the free state, but more frequently in combination with sulphur and the metals, forming a large group of bodies called *arsenical minerals*. A. is usually prepared by heating *mispickel*—a mineral containing sulphur, iron, and A.—in iron tubes or retorts. The A. volatilises and condenses in proper receivers in the crystalline state, whilst sulphide of iron remains. A. is a brittle, crystalline substance, of steel-grey colour, and possesses considerable metallic lustre. It crystallises in the same form as antimony, with which element it is therefore isomorphous. See ISOMORPHISM. Heated to 180° C. in a closed vessel, it volatilises without fusing. Heated in contact with the air, it combines with the oxygen to form solid arsenious acid, the fumes of which have a very characteristic odour of garlic. The specific gravity of A. varies from 5.6 to 5.9, according to the method by which it has been prepared. The chemical properties of A. are more closely allied to those of phosphorus and nitrogen than to those of the metals; hence, in spite of its appearance and physical properties, which are of a metallic character, A. is generally regarded as a non-metallic substance, though chemists are not unanimous in this opinion. The atomic weight of A. is 150, and its chemical symbol As. A. combines directly with many elements. Thrown into chlorine, it burns, forming chloride of A., AsCl_3 . Heated in the air, or in oxygen, oxide of A., As_2O_3 , results; and, indeed, oxidation takes place slowly at ordinary temperatures. A. also combines directly with sulphur, if the two be heated together, forming orpiment, As_2S_3 , or realgar, As_2S_2 , according to the proportions employed. Indirectly, compounds of A. with almost every other element may be formed.

The compounds of A. exert a highly poisonous effect on animal economy, details concerning which will be found in the article ARSENIUS ACID. A. is employed in the arts to harden metals; thus lead is mixed with a small proportion of A. in shot-making.

Arsenical Minerals comprise a large number of substances which occur in nature, and contain the element arsenic combined with other bodies, chiefly sulphur and the metals.

Many of these minerals are of considerable importance, not only as a source of arsenious acid, but also on account of the metals they contain, of some of which they are the principal ores. The most important are the following: *arsenical pyrites*, or *mispickel*, $\text{FeS}_2\text{FeAs}_2$, found in Saxony, in the Harz Mountains, and in some of the Cornish mines. This mineral occurs in steel-grey crystals, having considerable metallic lustre, and is employed in the preparation of the element arsenic, and its oxide, arsenious acid. *Cobalt-glance* (*cobaltine*, *silver-white cobalt*), analogous in composition to mispickel, occurs in large crystals in Norway and Sweden. It is also found in Cornwall and in Silesia. *Nickel-glance*, $\text{NiS}_2\text{NiAs}_2$; *arsenical nickel*, NiAs_2 ; and *copper nickel* (*Kupfernickel*), NiAs , the latter found in Saxony, Bohemia, and Hesse, in copper-coloured crystals. All of these minerals are valuable ores of nickel. *Arsenical iron*, FeAs_2 . *Arsenical cobalt*, also called *tin-white cobalt*, CoAs_2 , found in Saxony; also the *arsenical fahlores* (*Fahlerze*), minerals which contain sulphur, antimony, copper, and iron, in varying proportions; and sometimes in addition to these, zinc, lead, silver, and mercury. *Realgar*, As_2S_2 , and *orpiment*, As_2S_3 , are native sulphides of arsenic. *Arsenolite*, As_2O_3 , native arsenious acid. *Red silver ore*, $3\text{Ag}_2\text{S}\cdot\text{As}_2\text{S}_3$, a sulpharsenite of silver; and *cobalt bloom*, $3\text{CoO}\cdot\text{As}_2\text{O}_3$, arseniate of cobalt. A. M., when heated before the blow-pipe, emit the characteristic odour of burning arsenic. They are mostly soluble in nitric acid.

Arsenious Acid, commonly called *white arsenic*, or simply *arsenic*, is an oxide of the element arsenic, having the composition represented by the formula As_2O_3 . On account of its uses in medicine and the arts, A. A. is a substance of much importance. It is prepared as a by-product in the extraction of many metals from their ores, the latter containing sulphur and arsenic in addition to the metal to be isolated. As a preliminary metallurgical operation, the ore is heated in a reverberatory furnace, connected with a large chamber of brickwork, into which the products of combustion pass. Oxidation of sulphur, arsenic, and the metal takes place, sulphurous acid and A. A. being produced, and both being volatile, pass into the brick

chamber, whilst the oxide of the metal remains on the hearth of the furnace. The A. A. condenses on the cold surface of the chamber in the form of a white powder, technically called *poison-meal* (*Giftmehl*), whilst the sulphurous acid, being gaseous at ordinary temperatures, either passes up a shaft and into the air, or is employed in the manufacture of sulphuric acid. The impure A. A. is purified by subliming it in iron vessels, becoming converted by this process into a transparent, colourless glass. A. A. recently sublimed has a very high specific gravity (3.7). If it be kept for some time, a change takes place both in its appearance and properties: it loses its transparency, becomes opaque and crystalline, and ceases to dissolve to the same extent as before in water. Thus A. A. exists in two distinct conditions, called respectively the vitreous and crystalline. A. A. is only slightly soluble in water, but hydrochloric acid dissolves it in abundance, partly converting it into *chloride of arsenic*, AsCl_3 . Nitric acid and *aqua regia* also dissolve it; and on evaporating the solution, *arsenic acid*, $3\text{H}_2\text{O}\cdot\text{As}_2\text{O}_3$, remains. A. A. is also soluble in solutions of the alkalies potash and soda, combining with them to form *arsenite of potash*, or *arsenite of soda*, as the case may be: the former of these is used in medicine, and is known by the name of *Fowler's solution*. A. A. is largely employed in the manufacture of the pigments called *Schweinfurth* and *Scheele's green*, and *orpiment*, or *king's yellow*. The two former are *arsenites of copper*; the latter, *sulphide of arsenic*, As_2S_3 . The glass manufacturer uses A. A. to decolorise green glass, by conversion of green *protoxide of iron* into yellow or slightly-coloured *peroxide of iron*. A. A. is also a valuable preservative. Skins are anointed with a mixture of A. A. and soap, called *arsenical soap*.

1. *Arsenic (Arsenious Acid), Properties of, as a Drug*.—This substance acts as an antiperiodic, alterative, and tonic to the nervous system. As an antiperiodic it ranks next to quinine, and is employed in ague, neuralgia, &c. It is employed as an alterative in diseases of the skin, especially in those of a scaly kind. It has also been used successfully in chronic rheumatism. It is much used as a tonic in cases where there is nervous debility, and also in nervous diseases of a spasmodic kind, such as epilepsy, chorea, &c. It is also used externally as an escharotic, to destroy lupus exedens, masses of cancer, &c., and is the chief ingredient in all pastes used by quack doctors for the cure of cancer. Arsenic accumulates in the body, and its administration must be stopped if the conjunctivæ become swollen, the bowels loose, the stomach irritable, and the tongue silvery white. Given internally, arsenic should be much diluted, and taken after food.

2. *Arsenic (Arsenious Acid) as a Poison*.—From two to thirty grains is a poisonous dose for an adult; the average fatal dose, three grains. In acute poisoning by this substance, the symptoms may come on quickly, or not until two or three hours after the dose. There is depression, faintness, nausea, severe burning pain at the pit of the stomach, vomiting, purging; urine scanty, high-coloured, bloody; intense thirst, cramps in the legs, swollen abdomen; the pulse is thready and irregular, and death is preceded by increased faintness, spasmodic movements, hiccough, and delirium. Arsenic may also act as a chronic poison, if given in small, oft-repeated doses. The symptoms of chronic poisoning are those of gastro-intestinal irritation, red, suffused eyes, frontal headache, tremblings, and a peculiar skin eruption called *eczema arsenicale*. The treatment in cases of acute poisoning is to empty the stomach as quickly as possible by the stomach-pump, and give lime-water, or chalk-and-water. If nothing else can be had, break down the plaster of the room, mix it with water, and cause the patient to swallow the draught. Give milk and light farinaceous food after the acute symptoms have passed off. Although so poisonous, it appears that the system may become inured to it by constant use in small doses. The mountaineers of Styria and the Tyrol eat quantities often amounting to three or four grains daily, and they are said to give it to their horses also.

Arsin'oe, daughter of Ptolemy I., King of Egypt, born about B.C. 316, married in 300 to Lysimachus, King of Thrace, whose son Agathocles had married Lysandra, her half-sister. Anxious to secure the succession for her own children, she induced her husband to put his son to death. The widow of the murdered man flew to Seleucus, King of Syria, who declared war against the Thracian monarch; but Seleucus himself was soon after assassinated by a half-brother of A., who then

offered her marriage, his motive being to destroy her two sons, who might one day prove dangerous rivals; and he had no sooner obtained her consent, than he carried out his barbarous design. Fleeing to Egypt (279), she there married her own brother Ptolemy II., Philadelphus, by whom she was most tenderly beloved, and who gave her name to several cities, and to an entire district of Egypt.

Arson is the malicious setting fire to a dwelling-house. If any one is in the house when the offence is committed, it is punishable with penal servitude for life. To cause a fire by negligence is not A., but it may form ground of action for damage, if the property of another is consequently injured. An intention to set fire to a house in town, without intending to injure any one, though not A., is punishable as a high misdemeanour. The setting fire to a stack of corn, or other farm produce, or to coal, wood, &c., is punishable with from seven years' penal servitude to penal servitude for life. The injury of property by gunpowder, or other explosive substance, is similarly punishable. The analogous term to A. in the criminal law of Scotland is *wilful fire-raising*. In certain circumstances, it is still in Scotland a capital crime, though the extreme penalty is never inflicted. It is in both countries a material aggravation of the offence if it is committed with the intention of committing a fraud. Under an Act of Geo. III., applicable to Scotland as well as England, and which has not been directly repealed, the setting fire to a ship or cargo, with the intention of injuring the owner or the underwriter, is a capital crime.

Art. Under the widest signification of this word we include all mechanical skill of execution having a basis of scientific knowledge. Without this basis, no amount of mechanical skill comes under the name of A., even in its widest sense. Thus, however deft be the fingers of a button or a pin maker, he is but a clever mechanic, not an artist. To some extent, of course, even the button-maker does require science; but he does not require it to a sufficiently appreciable extent to make us regard his craft as an A. To draw a precise line between artistic and mere mechanical skill is impossible. The shoemaker is a mechanic, not an artist; but we can conceive that, by bringing some special knowledge of the anatomy of the human foot to bear on his craft, he might so elevate it as to merit the name of an A. Again, if we are asked to draw a line of distinction between a science and an A., we should say, that where the science is futile, without a requisite and largely appreciable mechanical skill, we use the word A. Where, on the other hand, the knowledge is the main point, and the mechanical skill requisite to make it effective but little, then we speak of a science. Where the two forces are nearly equally balanced, we may with propriety use either word. Thus painting is an A., because, without requisite and largely appreciable mechanical skill, no science will make a painter. Doubtless, something beyond both science and mechanical skill is required to make a great painter; but for the sake of our illustration, we need not consider this. See Mill's *Logic*, vol. ii. c. xi.

Agriculture, or navigation, we should call a science; because to be a good agriculturist or navigator much special knowledge is required, and but little mechanical skill. A skilful surgeon we might with equal propriety call either a scientific man, or an artist. Ordinarily, however, we use the latter name only in its restricted sense; and when we say that a man is an artist, we mean that he devotes himself to the making of pictures. By A., again, in its restricted sense, we denote its application to one or other of the fine arts, or to literature.

Every great painter, sculptor, poet, musician, novelist, or essayist, must be cognisant, and more or less observant, of the rules of his A. But, on the other hand, no knowledge or nice observance of these rules, however much the critic may consequently mete out approval, will enable a man to produce a really great work without the subtle power of imagination. Scientific knowledge and mechanical skill in combination—i.e., A.—will not give a man imagination—genius; and if he has none of the *mens divinator*, then he must fail—not necessarily so in the world's estimation, because critics, who may themselves be destitute of genius, may approve; and critics largely influence the verdict of their generation, though not that of posterity. But if A. will not bestow genius, it enables a man to make the best of what he has. It thus does for his genius what economy does for his income.

Nature, it is said, is the artist's standard. The words are

sufficiently vague to make it impossible to say that they are not true; but the artist who copies literally from nature—who has not in his imagination a touchstone leading him to select, and even to alter—will produce a very unnatural and stiff result. It is recorded of Sir Walter Scott, that, visiting for the first time a scene which he meant to depict in poetry, he noted with infinite exactness each species of tree, flower, and shrub which beautified it. But then he did this as an auxiliary, that he might not put into his picture that which was *not*, and that he might select from that which *was* in the landscape. He did not suppose that a catalogue was poetry. He put it into the machinery of his mind, and it came out poetry. If, says Mr Ruskin, you would paint a bean-stalk, you must see in it more than a bean-stalk. A. will not give this higher vision; but it will help to make it effective. The fiction of our day shows some special examples of the additional force of genius when under the guidance of consummate A., and also of the prodigality of genius dispensing almost wholly with its laws. In *Silas Marner* we have a work of genius regulated by almost perfect A. In the *Pickwick Papers* it may almost be said that A. there is none. Yet we read and laugh, re-read and laugh again, regardless of whether the canons of criticism sanction our doing so or not. For the ludicrous is an element which, we suspect, transcends analysis; and even if it does not, the fact may remain that the intellect which can reduce it to law is not able to seize it, while he who does seize it is unable to follow the analysis. So in poetry, so in painting, the A. critic may find in one work much to approve of, nothing to condemn; in another, these conditions may be reversed; yet it may be that in the latter, he who knows nothing of the laws of A. in poetry and painting instantly feels the touch of genius which has eluded the grasp of criticism. Infinitely subtle is this touch; in poetry it will lie in the cadence of a syllable. Transpose a syllable, and the charm is gone. What a picture of the din, the glare, and carnage of war is instantly painted in the mind by the verse—

'Then shook the hills with thunder riven,
Then rushed the steed to battle driven,
And louder than the bolts of heaven
Far flashed the red artillery'!

Transpose by ever so little, and the vivid picture is gone—has vanished in! a newspaper paragraph. Doubtless the fact is owing to ascertainable law; and hence the power of the verse is in a sense the result of A.; but we suspect that the writer of this verse, and the writers of similar poetry, are probably ignorant of the law by which they produce the effect. They do so by the intuition of imagination and feeling, beyond which fact they can probably give no account of the process.

In fiction, the main scope of A. is twofold—the construction and elucidation of the story, and the development of the characters, some authors limiting their aim to the former, others limiting theirs to the latter, while others aim at success in both. Each chapter, or portion of a fiction, should possess an interest in itself; it should derive an interest from those which have gone before, and help to sustain the interest of those which are to follow; while, at the same time, the characters unfold themselves in dialogue, easy and natural as that of everyday life, and, as occasion requires, helping to develop the tale. There are many popular fictions written quite in opposition to these rules; yet are they the rules of A. in all classical fiction.

History of Art.—This has hitherto almost exclusively concerned itself with the particular arts of painting, sculpture, and architecture, though the most comprehensive treatment of the subject, would, as indicated above, embrace a survey of all imaginative work, including literature and music. In the works of the classical writers of antiquity, Pliny and others, we find tracings of the history of A.; but the overthrow of the Roman empire by semi-barbarous races, and the slow growth of civilisation and culture among the conquerors, hindered any development of the subject for a thousand years. A. itself, indeed, silently revived, and was insensibly transformed under the influence of new ideas, but no history of A. was written. During the middle ages the student may perhaps glean a little bearing on the subject, but anything in the shape of historical criticism is utterly unknown. With the revival of letters in the 15th and 16th centuries, however, a mass of fact respecting artistic subjects was brought together and treated of by various writers. The productions of Byzantine and Italian A.—the works of Michael Angelo and of Raphael—were contrasted with

the great works of the heathen world, and the influences of Christianity on A. thus inferred. The history of A., as forming a branch of the history of civilisation, may be said to have begun with the work of Winckelmann (1764). In recent times the subject has been similarly treated by Kugler, in his valuable work, the *Handbuch der Kunstgeschichte* (5 vols. 1872). There are few more interesting subjects of speculation than that of the bearing of the development of A. among a people upon their moral and intellectual progress—or, conversely, that of the manifestation in their A. of their moral and intellectual status. That there is an intimate connection between that which is good and that which is beautiful, is what no one who has an eye to see beauty in nature and A. will doubt; but that a generally diffused sense of the beautiful promotes the practical efficiency of a people is, it is to be feared, the reverse of true. The appreciation of beautiful scenery, painting, sculpture, and music, in a very high degree, somewhat indisposes a man for toiling after gold and going to war with his neighbour; on the other hand, it *does* dispose him towards ease and luxury. Yet it must be but a barbarous nation respecting whose A. no history can be written. See, besides the works mentioned, Vasari's *Lives*, and the modern works of Schnaase (1864), Lübke (1866); English, T. C. Jack, Edinb. 1873), Springer (1870), and Carrière (1871).

Ar'ta, a town in the vilayet of Janina, Turkey, on the river A., 7 miles from the N. shore of the gulf of the same name. It is the seat of a bishop, and was a considerable town when in 1828 it was stormed by the Greeks under Marco Bozzaris. It is an entrepôt for the commerce of Janina, 39 miles N., and has manufactures of woollens, cottons, leather, and articles of attire; its floccatas, or long shaggy cloaks, are highly esteemed. A bridge of Venetian construction here spans the river. Pop. (1873) 8000. A., anciently *Ambracia*, was founded by Corinthian colonists about 635 B.C., became a flourishing city, carried on a protracted and wasting war with the Amphilochians, and was finally conquered by Philip II. of Macedonia. Later it fell into the hands of Pyrrhus, who made it capital of Epirus, and adorned it with works of art. Successively held by the Ætolians and Romans, it rapidly declined, but rose again in the later days of the empire. Under the Byzantines it was strongly fortified, and under the new name of A. played an important part in the wars of the 12th c., was wrested from the Turks by the Venetians in 1688, conquered by Ali Pasha in 1798, and reconquered by the Turks in 1821.

Ar'ta, Gulf of (anc. *Sinus Ambracius*), an inlet of the Ionian Sea, partly separates Turkey from Greece. It is 25 miles long and 10 wide, but its entrance is shallow and intricate. To the S. of the entrance is the promontory La Punta (anc. *Actium*, q. v.), and on the N. side stands the town of Preveza.

Artabazus, the name of several Persian generals, of whom the following are the best known: 1. **A.**, the Median, who flourished in the 6th c. B.C., and is celebrated for his devotion to Cyrus.—2. **A.**, son of Pharnaces, accompanied Xerxes on his invasion of Greece as far as the Hellespont with 60,000 men, and at a later period joined Mardonius, whom he vainly attempted to dissuade from fighting the battle of Platea. His retreat to Asia was a proof of his capacity.—3. **A.**, general of Artaxerxes, first employed to suppress the Egyptian rebellion, 450 B.C.—4. **A.**, a general employed by Artaxerxes II. to crush the sedition of the imperial satraps, 362 B.C., but completely defeated by Datames, satrap of Cappadocia. He fought at the battle of Arbela, and accompanied Darius in his flight. Alexander, in appreciation of his fidelity, made him governor of Bactria.

Artan'tha. See MATICO.

Artaxerxes (according to Herodotus, the word means 'great warrior') is the name of three Persian kings.—1. **A.**, surnamed *Longimanus*, because his right hand was longer than the other, reigned forty years (465–425 B.C.). He was the son of Xerxes I., who was assassinated by Artabanus, the captain of his guards. A. slew the latter in the presence of the army, and exterminated his partisans. The most notable events in his reign were his suppression of an Egyptian rebellion, his restoration of the independence of the Greek cities in Asia Minor, and his permission to the Jews to re-establish their worship at Jerusalem.—2. **A.**, surnamed *Mnemon*, on account of his great memory, succeeded his father, Darius II., B.C. 405, and died B.C. 361. His long reign of forty-four years has at least one famous

episode, the revolt of his brother, the younger Cyrus, who was aided by 10,000 Greek mercenaries. The retreat of the 10,000 through the highlands of Armenia, under the command of Xenophon, is one of the finest military exploits of antiquity, and is described with beautiful simplicity by the leader himself. See ANABASIS and XENOPHON. He fought against the Lacedæmonians, and forced them to cede to him again the suzerainty of the Greek cities of Asia Minor, but was less fortunate in his attempts to subdue an insurrection in Egypt.—3. **A.**, surnamed *Ochus*, was the son and successor of the foregoing. He ascended the throne in 360 B.C., after murdering two brothers and eighty half-brothers. He was successful in reducing Egypt to submission, but excited universal hatred by his cruelties. A gross outrage on the religious feelings of the conquered people—viz., the slaughter of the sacred bull Apis, which he ordered to be served up at a feast—induced his vizier, the eunuch Bagoas (himself an Egyptian), to poison him, 336 B.C.

Artedi, Peter, a distinguished Swedish naturalist, was born, February 22, 1705, at Anund, in the old province of Angermanland. He studied medicine at Upsala, where he became acquainted with Linnæus, and so great was their friendship that each subsequently made the other heir of his MSS. A. devoted himself to fishes, while Linnæus studied insects and birds. After residing for a year in England, A. went to Leyden in 1735, where he met Linnæus, just returned from a Lapland excursion. Here A. prematurely met his death by falling into a canal, December 27, 1735. Linnæus published, along with a memoir, his *Ichthyologia, sive Opera omnia de Piscibus* (Leyden, 1738, 2d ed., with corrections and additions by Walbaum; Greifswald, 1788–92). Cuvier says that A. is the first writer who treats the subject of fishes in a scientific spirit.

Artemisia, the name of two famous queens of antiquity.—1. **A.**, Queen of Halicarnassus, who, after the death of her husband Lygdamis, joined Xerxes with five ships, and distinguished herself at Salamis (B.C. 480).—2. **A.**, Queen of Caria (died 352–350 B.C.), the sister, wife, and successor of Prince Mausolus, to whom she erected the splendid monument from which is derived the name Mausoleum (q. v.), and which was excavated by Newton in 1857.

Artemisia, a genus of shrubby or herbaceous greyish-coloured Composite plants, commonly called wormwood. *A. Absinthium*, or common wormwood, was well known to the ancient Greeks as a medicinal plant; they called it *Asinthion*. This, as well as other species, possesses aromatic, bitter, and tonic properties, and is used as a stomachic, and also as a vermifuge. The flower-stalks and heads of a number of species of A. are sold as wormseed, and are powerful anthelmintics. They are principally imported from the Levant. The Chinese prepare moxa from *A. Moxa*, which produces a sore when burned on the skin, on the same principle as a blister. The bitter aromatic *extrait d'absinthe* is manufactured from a species of A. growing in Switzerland. It is much used in France, and forms an agreeable stomachic. *A. Abrotanum* is the shrub called southernwood or 'old man' in gardens. Sprigs of this plant are often placed in wardrobes to prevent clothes being destroyed by moths, it being very obnoxious to insects. *A. Dracunculis*, the estragon or tarragon of Siberia, has a peculiar aromatic taste, without the bitterness which characterises the other species. It is used as a pickle, and to flavour fish-sauces and vinegar. *A. vulgaris* is a common British plant called mugwort.

Artereotomy is cutting into an artery, so as to permit an effusion of blood. It is now very rarely, if ever, practised in medicine.

Arteries, Diseases of. A. are liable to various diseases, of which the following are the chief:—

1. *Atheromatous degeneration*.—This is a variety of fatty degeneration in which the muscular coats are chiefly involved. It may lead to rupture of the wall of the vessel, and effusion of blood into the brain, or other important organ.

2. *Calcareous degeneration*.—In this condition, which may be preceded by atheroma, the wall of the vessel becomes brittle by the deposition of earthy salts in its coats, or in the fatty matter formed by previous fatty change. It frequently commences in the internal coat of the larger vessels. This condition may also lead to sudden rupture.

3. *Amyloid degeneration*.—This consists in the formation of a

glue or starchy-like matter, which becomes diffused through the coats of the vessel. It occurs chiefly in the middle coats of the smaller A., the walls of which become thickened. See **AMYLOID DEGENERATION**. This state of the A. is usually associated with similar morbid changes in other important structures, such as the kidneys or liver.

4. **Arteritis**, or inflammation of the A., is a very rare disease in the acute form, but it may follow surgical operations.

5. **Aneurism**.—Dilatation of one or more of the coats of an artery. See **ANEURISM**.

6. **Wounds**.—When an artery is accidentally cut, the blood, of a scarlet colour, escapes in a series of jets which correspond to the contractions of the heart. Hæmorrhage from a large artery is rapidly fatal unless arrested. Should such an accident occur, pressure must instantly be made on the side of the wound next the heart, so as to compress the artery. A tight ligature may be applied, so as to surround the limb. To effect complete stoppage of hæmorrhage, the artery must either be tied by a ligature (a proceeding requiring surgical assistance), or pressure made on the bleeding wound by a series of small compresses made of cotton or lint, so arranged as to have the smaller next the wound, larger ones over these, and so on, the whole being firmly secured by a bandage. For the different modes of arresting hæmorrhage, see **HÆMORRHAGE**.

Artery. The arteries are vessels which carry the blood outwards from the direction of the heart towards the periphery of the body. They terminate in the capillaries, from which originate the veins. The name A. was given by the ancients to these vessels because they were then supposed to contain air—an error exploded by Galen. As an A. is traced outwards, it is found to give off branches, usually at an acute angle with the main trunk; but occasionally an A. divides into several branches at once, none of which are so large in calibre as the main trunk. When arteries unite, they are said to anastomose. Arteries usually pursue a straight course, but they are sometimes tortuous, as in the case of the spermatic arteries in the ass, bull, or ram. Such a tortuous arrangement must impede slightly the velocity of the current of blood, and also admit of a considerable amount of movement or stretching. The larger arteries are highly elastic, while the smaller have less elasticity but more contractility. This will be understood after considering their structure. All arteries, except the very smallest, have three coats, named, from their relative position, internal, middle, and external. 1. The internal is formed of a layer of epithelium (sometimes termed endothelium, and continuous with the capillaries), lying upon two layers of elastic tissue, one of which is perforated by numerous apertures, and is therefore called the *fenestrated* or window-like layer, while the other consists of fibres and bands of elastic tissue arranged longitudinally. 2. The middle coat consists of involuntary muscular fibre arranged circularly round the vessel. In the larger arteries this coat is arranged in layers separated by thin septæ of connective or elastic tissue, and the elastic tissue predominates, whereas in the smaller, the muscular layer is free from these septæ, and, relatively to the calibre of the vessel, is very much thicker. This anatomical difference explains the high degree of elasticity of the larger, and the great contractile power of the smaller. 3. The external coat consists of an inner layer of elastic tissue, and an outer of white connective tissue.

Arteries are supplied with minute capillaries, and with nerves. The nerves belong chiefly to the sympathetic system of nerves, which, by acting on the muscular fibres, keep the vessel in a state of partial contraction. See **SYMPATHETIC SYSTEM**. The special vital property of arteries is contractility, dependent on the muscular coat above described. See **CAPILLARIES**, **CIRCULATION**, **VEINS**.

Artesian Wells, so named from the district of Artois, in France, where they were first made, are perpendicular borings into the ground, through which water rises from various depths to the surface of the soil. Their action is due to the well-known hydrostatic law that water constantly endeavours to seek its own level. Suppose there be three contiguous strata of earthy material, the lowest and uppermost ones, such as clay, being impervious, or nearly so, to water, while the middle layer, such as



Artesian Wells.

chalk, permits water to percolate with ease through it. If these strata are bent into a cup-shape, so that the edge of the middle one crops out of the surface, obviously water will be collected between the two impervious layers, and will exert a strong upward pressure upon the lower side of the upper of these impervious strata. Accordingly, if we bore a hole through this top layer, the water will ascend, and endeavour to attain the level of the water at the edges. A. W. are said to have been long known to the Chinese. The Austrians have used them for hundreds of years; they are numerous in and about London, those which form the ornamental fountain in Trafalgar Square descending to a depth of nearly 400 feet; while that of Grenelle, in the neighbourhood of Paris, has the extraordinary depth of 1800 feet. Algeria has been also greatly benefited by such borings; and there seems reason to hope that these may yet change parts of the African deserts into beautiful oases. The temperature of the water thus obtained is found to increase with the depth, thus affording a powerful argument in favour of the interior heat of the earth.

Art'evelde, Jacob or Jacmart van, a popular leader in the early part of the 14th c., was a brewer of Ghent. He sided with England against France, in opposition to the French nobles of Flanders, whom he defeated and compelled to evacuate the city. For nine years he exercised sovereign power, proving himself in the main to be a bold and adroit leader; but his proposal that the Black Prince, son of Edward III. of England, should be chosen governor of Flanders, caused an insurrection in Ghent, in which A. was killed, July 19, 1345. His son Philip, at the head of the Ghentese, gained a great victory over Count Louis of Flanders at Bruges (1381), and was named Regent of Flanders; but after many further successes, he was defeated and slain at Rosbeke, November 27, 1382. Full of striking incident, his life has been the subject of several dramas, the best of which is Henry Taylor's *Philip van A.* (Lond. 1846.)

Art Exhibitions owe their establishment to the necessity of publicly displaying works of art, for the purposes at once of obtaining purchasers for the same, and of fostering public taste. After the time when a middle class sprang up through the extension of commerce and manufactures in the different countries of Europe, the patronage of art was no longer confined to ecclesiastics, princes, and nobles, whose pictures remained accessible to the public in churches and palaces, but was assumed by a vast class of merchants and burghers. These adorned their private houses with pictures, which exercised little or no influence on public taste, and rendered the establishment of A. E. necessary. A. E. are collections of works of painting and sculpture belonging (1) to the nation, as in the permanent exhibitions, National Gallery, South Kensington Museum, &c.; (2) to private individuals, from whom the works are obtained for exhibition on loan, as in the case of occasional exhibitions—as the Manchester Art Exhibition, the Exhibitions of National Portraits, and in a number of instances in the Gallery of the Royal Scottish Academy, &c.; or (3) to the artists who painted them, and who thus offer them for sale to the public. In the various annual A. E., the vast majority of the works exhibited belong to the class last enumerated. Besides the permanent A. E. of London, which have considerably increased within recent years—the last established being that of the Bethnal Green Museum—and the National Galleries at Edinburgh and Dublin, there are annual A. E. at Manchester, Liverpool, Birmingham, Glasgow, and Edinburgh; and at Cambridge, Coventry, Nottingham, Sheffield, and other towns, there are galleries in connection with the local schools of art. In France there are about 100 towns which have public galleries of art; and in Germany and Austria they are also very numerous. The Royal Commission of 1866 established in the clearest manner that it was to the A. E. of the country that the improvement of the public taste in art is due, especially to the Great Exhibitions of 1851 and 1862, and to the most successful Manchester Exhibition of 1857. The first exhibition of the Royal Academy took place in 1769, when few works were exhibited; while in that of 1875 there were exhibited 1408 works by 835 artists, and the receipts of the season, from the payments of visitors, realised an immense sum. Similar progress is seen in the northern part of the island. The first exhibition of the Royal Scottish Academy took place in 1826, when there were 178 works, by 27 contributors; that of 1875 contained 1029 works, by 439 artists. In both exhibitions a fair proportion of the pictures were sold.

Arthritis. This is a term usually understood as denoting a chronic or subacute inflammation of the fibrous textures of a joint, or of the fibrous coverings of muscles, dependent on the presence in the blood of an excess of uric acid. This form of the affection is known as gout. See GOUT. The term is also applied to rheumatic affections of the joints, in which, however, there is no permanent deposit. It also denotes in recent nomenclature a remarkable disease often called rheumatic gout, chronic rheumatic A., rheumatoid A., or chronic osteo-A., in which there is pain, swelling, contraction, and stiffness of the joints and limbs. In severe cases of this kind the joint is entirely destroyed. The fibrous textures surrounding it become thick, the cartilage covering the bones is absorbed, and the heads of the bones become enlarged from new ossific deposit. The causes of this disease are not known. The only treatment beneficial is such as promotes the general health and the nutrition of the body. No drugs appear to have the slightest effect.

Arthro'dia, a term first employed by an anatomist called Winslow, to denote a joint admitting of only a very slight degree of movement.

Arthrology is that department of anatomy which treats of the structure and functions of joints or articulations.

Arthropoda. The higher group of the *Annulosa* (see ARTICULATA), in which jointed limbs, articulated to the body, are present. The Arthropodous Annulosa include four classes: The *Insecta*, *Arachnida* (q. v.) (spiders, scorpions), *Myriapoda* (q. v.) (centipedes), and *Crustacea* (q. v.) (crabs, lobsters, &c.). The body, as in all Annulosa, consists of numerous joints or 'somites' arranged along a longitudinal axis. Each joint usually bears a pair of appendages. The skin is generally hardened by deposits of horny or limy matter. The head consists generally of six segments, and of never less than four. No *cilia* or vibratile filaments are developed in any of the A. The breathing is by gills, air-tubes (*trachee*), or pulmonary sacs. The heart lies on the back or dorsal aspect, and generally consists of an enlarged contractile chamber or cavity, which may be provided with valves.

Arthur and Arthurian Romance. A., a British warrior who flourished in the 6th c., but whose real story has been so distorted by fable and romance that it is hardly possible to feel sure of his existence. The earliest mention of him is made by the Welsh bards, that is, if we accept the antiquity assigned to their poems—an antiquity which, though assailed by Stephens and Nash, is, in a modified way, skillfully, and it seems to us successfully, defended by Skene. In these poems 'Athwys' appears as the *Guledig* ('military leader') of the Britons—a heroic prince, who successfully battles with heathen Picts and Saxons, but whose origin and history are entirely free from any obscuring halo of romance or magic. It is considered by some critics to be a fatal objection to his historical reality that neither Bede (who wrote in the 8th c.) nor the *Chronicle* (begun in the 9th) mentions his name; but it may be answered that Bede's silence extends to the century in which A. is believed to have flourished, and that the *Chronicle* concerns itself mainly with the struggles of the Britons and English S. of the Humber, while the exploits of the British prince were performed in a region far to the N. and W. This is, in fact, Skene's contention, and whether his critical analysis of the so-called Nennius produce conviction or not, it is impossible not to admire the ingenuity and consistency of his argument. After the Welsh bards, Nennius, whose name was latterly given to the work known as the *Historia Britonum*, and who flourished in the 8th c., is the oldest authority on the subject of A. In the fiftieth chapter of this work we read: 'Tunc A., pugnabat contra illos (i.e., Saxones) in illis diebus cum regibus Britannorum, sed ipse dux erat bellorum.' The writer then proceeds to mention the twelve battles in which A. vanquishes his foes. A minute examination of the chapter has led Skene to the conclusion that the popular notion of A. as a prince of S. Wales, derived from Geoffrey of Monmouth and the later romances, is incorrect, and that in all probability he was a Cumbrian or Strathclyde Briton, an hypothesis fortified by numerous traditions in the W. and centre of the country now called Scotland. We are disposed to accept Skene's conclusion that 'the A. of Nennius is the historical A.' After Nennius, there is a silence in literature regarding A. for upwards of 400 years. During that period vast changes had taken place in Western Europe, and,

above all, the belief in the marvellous and the supernatural had received an enormous development. Nowhere is this more widely visible than in the story of A. as moulded anew by the brilliant but credulous genius of Geoffrey of Monmouth. In his *Historia Britonum* we see the origin of that A. R. which fed the wonder of the middle ages. To what extent it is a creation of the Welsh archdeacon's patriotic imagination, it is impossible to say; but while we may suspect his declaration that he only translated his *Historia* into Latin out of 'a very ancient book in the British tongue,' it is not an irrational supposition that it contains, besides the splendid additions of his own invention, the gathered riches of centuries of legend, both Armorican and British. The appearance of Geoffrey's work (appropriately dedicated to the Earl of Gloucester, son of Henry I. by the daughter of Rhys ap Tewdwr, the last prince of S. Wales) marks the transference of the A. R. from Cumbria to S. Wales, and the beginning of that phantasmagoria of fiction from which all traces of historical truth or even of verisimilitude utterly vanish. Henceforth the romancers of the middle ages, whether in verse or prose, revel in the description of gorgeous scenes and incredible exploits. The simple *Guledig* of the Welsh bards, and the *dux bellorum* of Nennius, is transformed by Geoffrey into a world-famous monarch, who, after vanquishing the Saxons, Scots, and Picts at home, makes victorious expeditions abroad, successively reduces Ireland, Iceland, Gothland, the Orkneys, Norway, Dacia, Aquitaine, and Gaul, while in a great battle in the valley of Suesia he inflicts a tremendous defeat on the Romans, though they are supported by the forces of every Eastern king whom Geoffrey's memory or imagination can summon to their help. We now learn for the first time that his father was Uther Pendragon, and his mother Igera, wife of Gorlois, Duke of Cornwall. Merlin does not play any part in the reign of A., but in those of Ambrosius Aurelianus and Uther he figures as the prince of magicians, and A. himself, according to Geoffrey, owed his existence to his medicinal enchantments. A.'s somewhat mysterious fate was brought about, we are told, by the treachery of his nephew Modred (the *Medraut* of the Welsh bards), who, during his absence in Italy, had seduced his wife Guinevere, raised a revolt, and summoned the heathen Saxons to his aid. A., mortally wounded in battle, was carried to the Isle of Avalon to be healed of his wounds, and there Geoffrey leaves him. During the next two centuries (13th and 14th) the A. R. continued to grow through all Latin Christendom, until it became simply a magnificent mirror of mediæval chivalry—of its valor, tenderness, superstition, piety, and licence. New characters, unknown to Geoffrey, are introduced, legends that had originally no connection with A. are woven into the many-coloured web of the A. R., such as the saintly legend of the Holy Grail, which first becomes Arthurian in the *Quest*, the witcheries of Vivien, and the story of Lancelot of the Lake. All the splendours of Oriental fancy that had reached the West through the influence of the Crusades, the Moors of Spain, and the ceaseless action of literature, are seen shining in the Arthurian poems of the *trouvères* of France and England, and the *minnesingers* of Germany. At least six different romances are included in the Arthurian cycle: (1) The romance of A. himself, including the *Mort* or *Death* of A.; (2) Merlin (q. v.); (3) Lancelot of the Lake (q. v.); (4) The Holy Grail (q. v.); (5) The Quest of the Holy Grail; (6) Tristram and Yseult (q. v.). Finally, the romance passed into prose in the 15th c., and in an English form was printed by Caxton in 1485, from a compilation made by Sir Thomas Malory in 1461. This is the easy source from which Tennyson has drawn not a little of the spirit, the colouring, incidents, and the language of his famous *Idylls*. The best edition is that dated for the *Library of Old English Authors* by Wright (1866), from the text of the latest black-letter edition of 1634. It is from Malory that English readers have long derived their idea of A. as a peerless prince, presiding over a court of fair women and brave men, and shedding a kind of celestial influence upon his times by his unblemished virtue and unrivalled magnanimity, till the infidelity of Guinevere and the perfidy of Lancelot dissolved, as with fatal sorcery, the whole beauty and strength of the noble companionship. It is certainly not a little remarkable that a British prince, whose name was beneath the notice of contemporary history, and the earliest records of whom are meagre and indefinite, should have had the fortune in later ages to become more illustrious in romance than Charlemagne himself. Perhaps the true explanation of the phenomenon may

be that the Norman *trouvères* who first began to make the story famous in the West, took all the more willingly to a hero whom tradition represented as the implacable foe of the English race, and whose victories were grateful to the descendants of the warriors that conquered at Hastings. See Turner's *History of the Anglo-Saxons* (7th ed. 1852); Grässe's *Die Grosse Sagenkreise des Mittelalters* (Leipz. 1842); Stephens' *Literature of the Kymry* (1849); Nash's *Talesin; or, The Bards and Druids of Britain* (1858); Skene's *Four Ancient Books of Wales* (Edinb. 1868); and Glennie's *Arthurian Localities* (1869).

Arthur's Seat, a picturesque hill overlooking Edinburgh to the S.E. It is 822 feet high, and commands a magnificent prospect. The chief rock is trap, which in vast tabular masses has broken through the Carboniferous strata, and frequently encloses portions of hardened sandstone. Salisbury Crags, a vast crescent of rugged cliffs from 60 to 80 feet high, crown a steep hill about 500 feet in height to the N. of A. S., and overhang the older part of Edinburgh. The upper part of A. S. is formed of basalt, as are also the angular columns called 'Samson's Ribs,' on the W. side. If Skene's interpretation of the chapter in Nennius relating to A. S. be correct, it was the scene of that monarch's eleventh battle, and preserves in its name a memory of the event. See *The Four Ancient Books of Wales*, p. 57.

Artichoke, the common name for *Cynara Scolymus*, a hardy, perennial, thistle-looking plant, belonging to the order *Compositæ*. It is a native of Barbary and the S. of Europe, and has long been cultivated for the sake of its excellent flower receptacle, called the 'choke,' and the bases of the fleshy flower scales, which are used as a vegetable. They have a very delicate and agreeable flavour, and are much used on the Continent, being cooked in a variety of ways. The heads of flowers, when young, are used for pickling. Its flowers curdle milk like rennet, and the plant is said to furnish a good yellow dye. The *Cardoon* (q. v.) is a closely allied species. The Jerusalem A. (q. v.) belongs to a different genus.

Article (Lat. *articulus*, Gr. *arthron*, a joint). The Greek grammarians correctly used this grammatical term, because their A. really served as a 'joint' uniting several words together; the Latins, who had no A. in their language, applied the term more loosely to any short word, whether verb, conjunction, or pronoun; but Englishmen have no excuse now for retaining it, because their 'a' or 'an' and 'the' have no articulating power. Formerly it was different, at least as far as the A. 'the' is concerned, which, in the earliest English, could be used as a relative pronoun, like the modern German *das*, and therefore had an articulating power. The best English grammars now discard the name A. from the parts of speech, and consider 'a' or 'an' and 'the' to be still what they were in the beginning, the former (*an*, 'one') a numeral, and the latter (*that*, 'that') a demonstrative adjective.

Articles, The Six, were passed through Parliament in the year 1539, in the reign of Henry VIII., when the king had become reactionary in religion. They are as follows: (1) That the Eucharist was really the present natural body and blood of Christ; (2) that the Communion under both kinds was not necessary to salvation; (3) that priests could not by the law of God marry; (4) that vows of chastity, whether in man or woman, priest, monk, or nun, must be observed; (5) that private masses must be retained as essential; (6) that the use of auricular confession is expedient and necessary. They were subsequently called the 'Bloody Statute,' because the penalties attached to their contravention sent many persons to the stake.

Articles, The Thirty-nine, is the name given to the Confession of Faith of the Church of England. The first attempt at a Protestant Confession was made in 1536 by Henry VIII., who prescribed what doctrines should be taught in the Church. According to which instructions, the Scriptures and the ancient creeds were made the standards of faith; the doctrine of justification by faith was set forth; four of the seven Roman Catholic sacraments were left out; purgatory was left doubtful; but transubstantiation, auricular confession, and the worship of saints and images were retained. The above, in substance, was what was enforced by the Bloody Statute passed in 1539, which remained in force till the end of Henry's reign. Under Edward VI. Cranmer and Ridley drew up a confession of faith (1551), which, being approved by a commission of divines and the king,

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was published in forty-two articles. This confession, however, does not seem to have been approved by Convocation, and was not ratified by Parliament, although the king ordered it to be subscribed by all clergymen, schoolmasters, and churchwardens. But immediately after its publication Edward died; and one of the first acts of the Convocation summoned with Mary's first Parliament, was to declare that these forty-two articles had not been set forth by the agreement of that House, and that they did not agree thereto. A new confession for the Reformed Church was drawn up by Parker, Cranmer's successor in the see of Canterbury (1559), under Elizabeth. For this purpose he revised the forty-two articles of Edward VI., rejecting four entirely, substituting four in their place, and altering seventeen others. By Convocation (1562), the thirty-ninth, fortieth, and forty-second were rejected altogether; and thus the number was reduced from forty-two to thirty-nine. When they were printed, the twenty-ninth was omitted; but it was restored in 1571, in which year they were ratified by Parliament, and finally accepted as a fair declaration of the doctrine held by the Church.

Articles of War are regulations for the government of the army, including the forces in India, for the marine forces, and for the navy.

Articles of War for the Army are issued under the authority of the annual Mutiny Act (q. v.). The operation of these laws is confined to military offences, and in no way exempts the officer or soldier from the jurisdiction of the civil courts of the country; and in the event of a collision between the military and civil laws, the latter is supreme. The A. of W. relate to the duties of the soldier, to military offences, and to military rank. These articles issue directly from the crown.

Articles of War for the Marine Forces.—These articles are framed under the authority of another Mutiny Act, relating solely to the marines. They do not issue directly from the crown, but from the authority of the Lord High Admiral, or that of the commissioner for executing the duties of that office. The marines are subject to these articles only when on shore. At sea they are under the A. of W. for the Navy.

Articles of War for the Navy.—These are not framed under the authority of the Mutiny Act, but under that of the Naval Discipline (1866) Act. They are, in the letter, eminently severe; but, by the superior officers and naval courts, they are usually leniently and wisely administered.

Articulata, a name sometimes used synonymously with the newer term *Annulosa* to indicate a sub-kingdom or primary division of the animal world. The sub-kingdom is represented by worms, insects, centipedes, spiders, &c., and crustaceans. In all the body is composed of a series of joints or somites arranged in a longitudinal manner; hence the names 'A.' and 'Annulosa,' meaning 'jointed.' The outer skin may be horny or calcareous, and to the hard investment, when present, the muscles are attached. The heart, when developed, invariably lies in the dorsal or back region; the digestive system runs through the middle of the body; and the nervous system exists typically as a double chain of nerve-knots or ganglia, lying on the floor or ventral aspect of the body. The cesophagus or gullet pierces the nerve-chain at the anterior extremity of the body. The limbs are developed in pairs, and when present, are turned towards the nervous side or front of the body. The A. are divisible into the *Anarthropoda*, or Lower A., represented by the various kinds of worms; and into the *Arthropoda* (q. v.), or Higher A., represented by *Insects*, *Myriapoda*, *Arachnida* (q. v.), and *Crustacea*. The *Anarthropoda* possess no jointed limbs, the *Arthropoda* being provided with these appendages.

Articulate Sounds. See LETTERS.

Artificial Horizon is obtained by means of a perfectly calm and plane surface of a liquid (such as mercury) whose reflecting power is great. In obtaining the altitude of any object by this means, the sextant is brought as close as possible to the reflecting surface, and the true and reflected images of the object are made to coincide, so that the true angle is evidently half the observed angle.

Artificial Limbs. These are substitutes for limbs lost by accident or removed by operation. From the time of Ambrose Paré, in the middle of the 16th c., mechanicians have devoted much skill to the construction of artificial arms, hands, legs, and

feet. First constructed an arm and hand of iron, but it was so heavy that it could only be worn for a short period. The famous iron hand of Götz von Berlichingen, by which he could wield a sword, was three pounds in weight. In the beginning of the present century, Ballif, of Berlin, constructed, of lighter materials, a hand which could seize and retain an object, such as cloth, a hat, or a pen. Since that time many improvements have been effected, and motion has been secured in the elbow, wrist, and fingers, so that hands are now made by which a glass may be raised to the lips, or a pin picked from the ground. The best stump for the attachment of an artificial arm and hand includes two-thirds of the forearm. For details see a *Manual of Orthopraxy*, by Heather Bigg, 2d ed., London, 1869, pp. 134-160.

With regard to the lower limb, the first point of importance is the nature of the stump, because on it rests the weight of the body when the limb is used. In amputation above the knee, the length of stump most convenient for an artificial leg is two-thirds of the thigh. In amputation below the knee, the stump should not be shorter than one third of the leg. By careful arrangements, however, an artificial leg may be adapted to a stump only a few inches in length. In the language of orthopraxy, the part of the artificial leg which receives the stump is termed the *bucket*, the *bolts* are the various centres which fix the parts of the leg together, and around which there is axial motion; while the *springs* may be regarded as elastic motor appliances for regulating the action of the ankle and toe joints. The simplest form of leg is the common *pin* leg used by the poor, which consists of a bucket and a *pin* which reaches to the ground. Another form is the *box* leg, such as is worn by pensioners, and is suitable for amputations below the knee. It consists of a trough to receive the knee, a pin to stretch from the trough to the ground, and a shaft to fix it to the wearer's body. There are numerous other contrivances for obtaining movement at the knee and ankle. The chief of these are the Anglesea leg, contrived by the late Marquis of Anglesea, the Palmer leg, and Dr Bly's leg. The latter is an admirably constructed artificial leg, admitting of rotation and lateral action of the ankle joint, and having a self-acting spring in the knee joint which urges the leg forward in walking. For details see Heather Bigg, pp. 616-623.

Artillery is a term used with a variety of significations (1) It denotes cannon or other ordnance, (2) the shot and shell along with the cannon; (3) the body of men who manage the cannon, (4) both the cannon and the men. For a description of the larger pieces of ordnance, see the article CANNON. *Equipment of A* comprises the *personnel*, *matériel*, and *transport*. The different kinds of equipment are divided into *Batteries* (q. v.) for more convenience. The battery is the *tactical unit* of A.

Artillery Corps, first recognised as a distinct part of an army by Gustavus Adolphus, now occupy with all European nations as important a place as infantry and cavalry. They are divided into land-A. and marine-A., the former comprising field, garrison, and siege A., of which the field-A. is subdivided into horse and foot, and also into light, heavy, and reserve A. Military opinion has varied as to the number of guns which should accompany an army in the field, but since the Franco-German war of 1870—which was essentially a war of A.—most authorities are agreed that there should be four field guns for every 1000 infantry, and five or six horse-A. guns for every 1000 cavalry. This proportion, however, necessarily varies according to the nature of the country and the means of transport.

Artillery, Park of, is a term used to denote all appurtenances, guns, carriages, ammunition, &c., requisite for the working of A., and includes besides whatever is necessary for their repair. It does not, however, include the *personnel*, that is, the officers and men, together with the necessary smiths, armourers, wheelwrights, and other mechanics and labourers. In battle or siege the park of A. is protected from the enemy's fire, and its position is always chosen with a view to easy access. Tools and instruments for field purposes, such as intrenching and pioneering, are placed nearest the field of action, while the laboratories for the preparation of shot, shell, and other ammunition are at a greater distance.

Artillery, Schools of, are institutions for the instruction of officers in the tactics and art of A. warfare. The first school for this purpose was established by the Venetians in the beginning of the 16th c.; and soon after similar schools were founded at Burgos and in Sicily by Charles V., and in France by Louis

XIV. In 1795 the famous French school, the Polytechnic, was established. Germany has its most important school at Berlin; and Russia, Austria, and Italy have also thoroughly-equipped institutions for A. instruction. The great A. school of England is the Royal Military Academy at Woolwich, which possesses twenty-two professors and instructors. The students enter between the ages of seventeen and twenty, and are recruited by competitive examination. In connection with the Woolwich Academy are some subordinate institutions, such as the *Department of A. Studies*, and the *School of Gunnery* at Shoeburyness. See Lieutenant-Colonel Owen's *Modern Artillery* (Lond. 1871).

Artillery Company, Honourable, the oldest existing volunteer corps in England, dates as far back as the reign of Henry VIII. In 1537 that monarch granted power to three persons, who were nominated 'Overseers of the Science of Artillery,' to establish such a company for the practice of shooting both with bow and arrow and firearms. James I. and Charles I. successively ensured the preservation of shooting and shooting-grounds about London for the A. C.; and in 1638 the corporation of London presented to the company the artillery-grounds near Moorfields for military exercise. The company has never experienced actual warfare, but in 1780, during the Gordon riots, it successfully defended the Bank of England from the attack of the No Popery rabble. The members are elected by ballot, and pay an annual subscription of one guinea, besides furnishing themselves with the necessary dress and accoutrements. The corps is made up of ten companies, six of which are infantry, one grenadier, one artillery, one rifle, and one light infantry. Since 1849 the crown has appointed the officers. See Rankes's *History of the H. A. C.* (vol. 1, 1875).

Artillery, Royal Regiment of, the collective name for the whole A. of the British army, which consists of two parts, namely, the Royal A. and the Royal Horse-A. It was first formed during the reign of Queen Anne, and though greatly increased since that time, and now forming quite an army in itself, it is always constituted but one regiment. This is different from the arrangements prevailing in Germany, France, Russia, and other great powers, where the A. force is divided into numerous regiments. The foot A. of the British army consists of *heavy* and *light* A., the former for siege-work or the defence of fortified places, the latter for field-work. The horse-A. accompanies the cavalry, and is provided with much lighter guns. The former is divided into brigades (Nos. 1 to 25), the latter into six brigades, named according to the first letters of the alphabet. The army estimates of 1874-75 show for the horse A. a force of 5711 men, of which 242 are commissioned officers, and for the foot A. a force of 29,055, of which 1159 are commissioned officers, thus indicating a total force of 34,766. In 1877 it was resolved to reorganise the 'regiment' by grouping the batteries irrespective of the brigade system.

Artiodactyla, a section of Ungulate or Hoofed quadrupeds, represented by the hippopotami, the swine, and all ruminants, and characterised by the fact that the included animals possess an even number of toes—two or four. The third toe on each foot forms a pair with the fourth toe. The vertebrae of the back and loins (dorsal and lumbar) collectively number nineteen. When horns exist, they are invariably developed in pairs. The stomach is generally of complex or compound nature. The A. are divided into the *Omnivora* (hippopotami and swine) and *Ruminantia* (sheep, oxen, deer, antelopes, camels, giraffes, &c.).

Artocarpus, an order of Dicotyledonous plants found in tropical countries, and abound in a milky juice. The genus *Artocarpus* is the type of the order. *A. incisa* is the Bread-fruit (q. v.) of the South Sea Islands; and *A. integrifolia*, the Jack (q. v.) of the Indian Archipelago, which is a favourite food among the natives. *Galactodendron utile* is called Palo de Vaca, or cow-tree, in Demerara, from its nutritive juice being used as milk. *Antiaris toxicaria* is the source of the famous poison called Bohun or Pohon upas. See UPAS. *A. saccharosa* is the sacker-tree of the W. Indies. The wood of *Pipturus Guianensis* is the snake wood or letter-wood of Demerara. The seeds of many of the A. are eaten. *Bromum alcastrum* yields bread-nuts, which are a nutritious and agreeable food when boiled or roasted.

Artois, a former province in the N.W. of France, now chiefly represented by the department of Pas-de-Calais. It was made a county in 1239 by Louis IX., afterwards belonged to the Counts of Flanders and Dukes of Burgundy, but was finally ceded to France in 1678. Charles X. for some time bore the title Count d'A. Arras (q. v.) was the capital. Artesian wells derive their name from A., where they were known in early times.

Arts, Degrees in. On the institution of universities in the middle ages, the 'Faculty of A.' comprised the students in science and philosophy, in contradistinction to those in the faculties of theology, law, and medicine. The 'A.,' or 'liberal A.,' were seven: grammar, logic, rhetoric (the *Trivium*); music, arithmetic, geometry, and astronomy (the *Quadrivium*). Originally a teacher was a Master or Doctor, but the former term came to be appropriated by the teacher in the 'A.' When it became necessary for every teacher to establish his fitness for his office, examinations were instituted, the result of which was to class the candidates in different 'grades' or 'degrees.' The initiatory degree of *Bachelor* (q. v.) was instituted by Gregory IX. (1227-41). The *master*, who had a further and higher examination to undergo, was not only entitled but required to teach—a practice long discontinued. See **DEGREE**.

Art Unions are associations for the purchase of pictures to be distributed by lot. They originated in France early in the present century, and were subsequently extended to Belgium, Germany, England, America, and other countries. The first important Art Union was that of Mechlin or Malines (1811); but Munich Art Union (1823) became the model for most Continental institutions of the kind, though in point of importance it is now far surpassed by that of Düsseldorf (1829). In England the first Art Union was founded at Liverpool (1834), and was followed in 1836 by the London and Scottish A. U. In the same year appeared a 'report,' issued by a select committee of the House of Commons, appointed 'to inquire into the best means of extending a knowledge of the arts and of the principles of design among the people (especially the manufacturing population) of the country.' In pursuing this inquiry, the attention of the committee was drawn to the '*Kunst-Vereine*,' or A. U. of Germany. 'These associations, for the purchase of pictures to be distributed by lot,' say the committee, 'form one of the many instances in the present age of the advantages of combination. The smallness of the contribution required brings together a large mass of subscribers, many of whom, without such a system of association, would never have been patrons of the arts.' Before this committee Waagen was examined, and this eminent authority on artistic matters highly estimated the advantages conferred on the arts by such associations, which had prospered in Prussia since their first introduction there by the king and his minister Humboldt. Ten years after the issue of the report referred to the A. U. Act (9 and 10 Vict. c. 48) was passed. It exempts societies which have been formed for the distribution of works of art from the operation of the Lottery Laws; but it was opposed by Sir R. Peel, who entertained great doubt whether these A. U. had a tendency to encourage a high style of art. The Act might lead to an increased demand for inferior productions, but he did not think it would encourage any productions which might not be dispensed with without any great detriment to the interests of the arts. In June 1866 appeared the 'Report from the Select Committee on Art Union Laws, together with the Proceedings of the Committee, Minutes of Evidence, and Appendix.' This most valuable document traces the history of the chief A. U. of the country, and arrives at the deliberate conclusion, on the evidence of a number of eminent artists and other witnesses, that these associations are not of any real benefit to art or artists. 'The tendency of A. U. has been to foster the love of chance and speculation rather than to encourage high art.' And while these institutions have failed to further the advancement of art, that object has been attained, so far as it is possible to attain it, by quite other institutions—namely, Schools of Design (q. v.) and Art Exhibitions (q. v.). 'The London Art Union, and the Glasgow Art Union,' says the report already named, 'are superior to all the others, for each subscriber annually receives an engraving or book of prints to the full nominal value of his subscription. A considerable profit or surplus remaining over to the credit of the society, the surplus is expended in buying pictures, or in producing statuettes, bronzes, medals, and chromo-lithographs, for distribution by lot. The average value of prizes in the London

Art Union is £32. 10s. The chance against winning a prize is 99 to 1. In the year 1859 the chance against winning a £25 prize was 144 to 1. In the Shilling A. U. the average value of prizes is from £5 up to £15. In the Birmingham Shilling Art Union, the chance against winning a £15 prize, in 1859, was 325 to 1. The expenses of the Shilling A. U. generally swallow up at least 50 per cent. of their revenues. The London Art Union has, since its commencement, received £326,100 in subscriptions, while it has given £165,697 to the public in prizes, besides £86,260 worth of engravings distributed to the subscribers. Shilling subscriptions to A. U. were not heard of until 1858. The Liverpool Shilling Art Union was found to engender so much evil that the artists of Liverpool entirely withdrew from it. Like all the other Shilling A. U., it was a mere lottery, worked by the secretary for his own profit. The secretary was paid £500 a year, and he also received large sums of money for clerks and 'office expenses.' There was no check upon the sale of tickets, and each prizewinner received from the secretary a prize, the value of which was not more than half the amount supposed to have been won. It was, moreover, always doubtful whether a ticket obtained even the chance of a prize, for it could never be ascertained whether every ticket had been put into the wheel. The percentage of expenses to receipts in the Shilling A. U. was very high, amounting to as much as 50 per cent. The expenses consisted partly of commissions to agents, and partly of the cost of advertising; they were in some measure due also to frauds by local agents. As the expenses were so great, it follows that the public paid twice as much for their shares as those shares were worth. It having clearly appeared from the evidence taken by the Royal Commission of 1866 that the Shilling A. U. were by no means beneficial to art, and were, moreover, liable to gross abuses of management, certain conditions were proposed for their better regulation, but it remains to be seen if they will prove successful.

Artvin, a town in the vilayet of Trebizond, Asiatic Turkey, 100 miles E. of Trebizond, with a trade in oil, honey, wax, and butter. Pop. about 6500, the majority of whom acknowledge the authority of the Bishop of Rome.

Arum, a genus of Monocotyledonous plants of the order *A. Araceae*, characterised by having a large spathe enclosing the flowers. All the species of A., and those of allied genera, possess a similar combination of acrid properties, along with starchy matter, which can be separated, however, from the poisonous matter by means of water or heat. *A. maculatum* is a British species found in damp woods and under hedges, it is commonly called cuckoo-pint, lords-and-ladies, or wake-robin. At one time it was extensively cultivated in the Isle of Portland for the preparation of arrowroot, which was obtained from its corms, and sold under the name of Portland arrowroot or sago. The plant is still cultivated in India for food, the acidity being got rid of by boiling. In Switzerland its corms are used as a substitute for soap; and in France the cosmetic called cypress powder is prepared from them. *A. Indicum* is also cultivated in some parts of India for its esculent stem and corms. *A. Italicum* is found in the Isle of Wight. The corms of *A. montanum* are employed in India to poison tigers. *A. Dracunculoides* or dragon-plant has a snake-like spotted stem, and is commonly cultivated in British gardens as an ornamental plant. A large amount of heat is given off from the flowers of different species of A. during the period of flowering.



Arum maculatum.

Arundel, a market town of Sussex, on the Arun, 5 miles from its mouth, and 19 miles W. of Brighton. It consists chiefly of a long, steep street, rising to the brow of a hill crowned by a castle, the ancient residence of the Dukes of Norfolk. The river is navigable for small vessels, and is here crossed by a stone bridge. There is some export trade in timber, bark, and corn. Pop. (1871) 2956. The castle is a Norman structure,

covers 5½ acres, and has a massive dungeon-keep. During the civil wars it was destroyed, but it has in late years been restored, and is still the Norfolk family residence.

Arundel, Thomas, Archbishop of Canterbury, second son of Richard Fitzalan, Earl of Arundel, was born at Arundel Castle, Sussex, 1353. At the age of twenty-one he was consecrated Bishop of Ely, in 1386 was appointed Lord High Chancellor of England, and was raised to the primacy in 1396. Richard II., having struck a sudden blow at the party of the Duke of Gloucester, A., a chief supporter of the duke, was condemned to exile, and fled to Rome. It was A. that urged Gloucester's nephew, the Duke of Hereford (afterwards Henry IV.) to undertake that invasion of England which resulted in the deposition of Richard, and in his own restoration to the see of Canterbury in 1399. He was a fierce persecutor of the Wickliffites. The Act for burning heretics (*De Heretico Comburendo*), 'the first legal enactment of religious bloodshed which defiled our statute-book' (Green's *Short History of the English People*, p. 258), was passed during the reign of Henry IV., and vigorously worked by A. and his brother bishops. A. also forbade, by synodal decree, the translation of the Scriptures into English. He died February 20, 1413.

Arundel Marbles, the remains of a collection of ancient sculpture formed by Thomas, Earl of Arundel, early in the 17th c., and presented by his grandson, afterwards Duke of Norfolk, to the University of Oxford in 1667. The collector—the earliest liberal patron of the fine arts among the aristocracy of England—employed Evelyn (q. v.) and Petty to procure for him the best obtainable examples of ancient art. His magnificent collection of sculpture, embracing 37 statues, 128 busts, 250 inscribed marbles, &c., was disposed of after his death, together with his other collections. The gems were purchased in Venice for £10,000. The A. M. bequeathed to Oxford include the 'Parian Chronicle,' fragments of an inscription in marble, said to have been executed at Paros, 263 B.C., and, in its complete state, containing a record of the great events of Greek history from the time of Cecrops (1582 B.C.) to that of Mlognetus (264 B.C.).

Arun'do, a genus of grasses. See REED.

Ar'va, a tributary of the Rhone, which it enters immediately below the Lake of Geneva, rises on Mont Blanc, and flows through the famous valley of Chamouni. It has a course of 50 miles, is a violent Alpine stream (according to Coleridge 'raves ceaselessly'), and is liable to sudden and destructive floods.

Arvic'ola. See VOLE.

Aryan is the name now applied to a group of languages and of races which formerly went under the name of Indo-European, or Indo-Germanic. It is derived from a Sanskrit word *arya*, which in the later Sanskrit means 'noble,' 'of a good family,' but which was originally a national name, being preserved in the Sanskrit name for India, *Aryavarta* ('the abode of the Aryans'), and in the Zend, *Airya*, which in the Zend-avesta of the Zoroastrians means 'venerable,' and is also the name of the people. The knowledge of the family relationship which exists among the different languages belonging to this group we owe to the genius of Schlegel, Humboldt, Bopp, &c., following up the discovery by Wilkins, Jones, and Colebrooke, some ninety years ago, of Sanskrit, the ancient sacred language of the Hindus. The discovery made by these men, which so completely revolutionised the views formerly entertained of the ancient history of the world, was this, that Sanskrit, Zend, and the languages of the Greek, Roman, Celtic, Teutonic, and Slavonic races were all varieties of a common type, and stood in the same relation to each other as the Romance languages do as dialects derived from the Latin. 'They all count with the same numerals, call their individual speakers by the same pronouns, address parents and relatives by the same titles, decline their nouns upon the same system, compare their adjectives alike, conjugate their verbs alike, and form their derivatives by the same suffixes.' The classification of the languages thus related, as given by linguists, is as follows: 1. The *Indic*, or Sanskrit, from which were derived the Prakrit dialects, partly seen in Pali, and finally corrupted into the modern Hindi, Hindustani, Mahratti, and Bengali. 2. *Iranic*, comprising Zend, Old and Modern Persian, Kurdish, Armenian, &c. 3. *Græke*: Classic and Modern. 4. *Italic*: Umbrian, Oscan, Sabine, Latin,

and, derived from the last, Italian, French, Spanish, Portuguese, Provençal, Rumanic. 5. *Teutonic*: (1) Low German, including Gothic, Anglo-Saxon, Old Saxon, Old Frisian; (2) Old High German; (3) Old Norse: with the existing forms of these three Teutonic dialects—English, Dutch, German, Danish, Norwegian, and Swedish. 6. *Slavonic*: Russian, Bulgarian, Polish, Bohemian, Illyrian. 7. *Lithuanian*: Lettish, Old Prussian. 8. *Celtic*: Welsh, Erse or Gaelic, Manx, Breton, Cornish.

The original home of the ancestors of the A. races, who spoke the primitive language from which all these cognate languages, with their derived dialects, sprung, is held by universal consent to have been the plateau of Central Asia. From this region the various tribes migrated at different times, those furthest W. in Europe probably going first, as is indicated by their languages having a fainter family likeness to the primitive language than have those of the tribes who settled in the East. The tribes that remained behind split into two parts, the one going S.E., the other S.W., and taking possession of India and Persia respectively.

Arzigna'no, a town in the province of Vincenza, N. Italy, with manufactures of woollens and leather, and a trade in wine and cattle. Coal and lime abound in the neighbourhood, and brickworks have also been established there. Pop. 7287.

As, a Roman pound; also a bronze coin, originally weighing a pound, though afterwards reduced to 1-48th, and even to 1-60th of a pound. Its value varied from three farthings to a halfpenny, and the oldest form bore the figure of some animal (*pecus*), whence, it is said, *pecunia*, money, is derived.

A'sa, son of Abijah, and third king of Judah, succeeded to the throne in 956 B.C. He was so zealous a rooter out of idolatry, that he deposed his grandmother Maachah from the important and influential position of 'king's mother' for having set up an 'idol' (literally, a 'horror') in a grove (1 Kings xv. 13). He set himself to fortify frontier cities, and levied an army of 580,000 men (according to 2 Chron. xiv. 8), with which he utterly routed the host of Zerah the Cushite, who had invaded Judah. A peace of twenty years followed, which was broken by Baasha, a king of Israel, against whom A. purchased the aid of Benhadad of Damascus with the treasures of the temple. For this he was censured by the prophet Hanani. A., whose heart is said to have been perfect with the Lord all his days, died in 916 B.C.

Asadul'ois, a plant belonging to the genus *Thapsia*, of the natural order *Umbellifera*, a native of the S. of Europe, which was valued by the ancients as an antispasmodic, diuretic, and purgative. It is not used in modern medicine.

Asafoetida, a drug formed of the concreted milky juice of *Narthex A.* (q. v.), and of that of various species of *Ferula* (q. v.),

two genera of Umbelliferous plants. It is imported from Persia and Afghanistan, and is largely used in medicine. It possesses stimulant and antispasmodic properties, and is employed as a stimulant in hysteria with excellent effect, and also in cases of flatulence and chronic catarrh. It has a disgusting odour, which is a serious impediment to its use, although the Persians use it as a condiment, and call it 'food of gods,' in strange contrast to 'devil's dung,' the popular name for it in this country.



Narthex asafoetida.

A'saph, St., a cathedral city, near the confluence of the Clwyd and Elwy, in Flintshire, Wales, 15 miles N.W. of Flint. It stands on a slight hill, in the richly-wooded vale of Clwyd. The cathedral—a miniature building—was erected in 1480, on the site of a wooden church said to have been founded in the 6th c. by Kentigern. With the Flint district burghs St. A. returns one member to Parliament. Pop. (1871) 1900.

St A., from whom the place takes its name, is traditionally reported to have been its first bishop, but we know almost nothing about him, and have no proof that he is the author of the writings attributed to him—viz., the *Ordinationes Ecclesie Sancti Asaphi*, and the *Vita Sancti Kentigerni*, contained in the first volume of the *Acta Sanctorum*.

Asarabacœa, the common name for *Asarum Europæum*, a plant doubtfully native in Britain, belonging to the natural order *Aristolochiaceæ*. Its roots and leaves are acrid and aromatic. Formerly A. was much used as a purgative and emetic. The powdered A. is employed in cephalic snuffs, to promote sneezing. In France it is called *cabard*, from its common use by drunkards to produce vomiting.

Asarum, a genus of Dicotyledonous plants of the order *Aristolochiaceæ*. *A. Europæum* is the most important species. See **ASARABACCA**.

As'ben. See **ABZ**.

As'calon, or **Ashkelon**, once a city of Palestine, on the Mediterranean, 36 miles W.S.W. of Jerusalem. Remains of the walls of a palace, and of some churches, still exist. Anciently one of the five cities of the lords of the Philistines, it came early into the possession of the tribe of Judah. It was embellished by Herod the Great, was long under the dominion of Rome, and was taken by the Arabs in the 7th c. After being repeatedly captured by Crusaders and Moslems in turn, it was utterly destroyed by Sultan Bibars in 1270. Near A. was the temple of Derecto, the Syrian Venus, and 'within the walls and towers now standing Richard (of England) held his court' (Stanley's *Sinai and Palestine*, p. 257). The neighbourhood is celebrated for its cypresses, figs, olives, pomegranates, and bees.

As'caria. This is a genus of intestinal worms which infests the alimentary canal of man and many other animals. It belongs to the group of *Nematoda*, or round worms. The one most common in man is *A. lumbricoides*. It resembles the common earthworm in size and general appearance. The body is smooth, tapering at both ends, and marked by many fine transverse rings. At the anterior extremity there is a mouth, surrounded by three small papillæ. The male worm is from 4 to 6 inches in length, while the female attains a size of from 12 to 14 inches. The manner in which the young enter the human body is not known; but it is generally held by naturalists that the ova are matured in water, and the young enter the body probably by direct transference from river or pond water. These worms do not usually exist in great numbers in the intestinal canal, but Küchenmeister mentions the case of a child which harboured about 400 of these worms. Their habitat is the upper part of the small intestine, and occasionally they reach the stomach, and may be dislodged by vomiting. One or two worms in the intestinal canal of a child produce usually no bad effects; but cases are on record in which these creatures have perforated the wall of the bowel, and passing into other cavities, have given rise to serious disease, and even death. The most effective remedy for their dislodgment is santonine, the active crystalline principle of *Artemisia Santonica*, a species of wormwood. Children may have from one to three grains of this substance twice or thrice daily, until six or eight doses have been taken, after which a small dose of castor oil should be administered. For further details see **INTESTINAL WORMS**. A variety of A. infests the cat, called *A. mystax*, the development of which has been carefully studied. See *Entozoa*, by Dr Spencer Cobbold, London, 1864, pp. 316-331.

Ascen'sion, a solitary island in the S. Atlantic, about 800 miles N.W. of St Helena, nearly midway between Africa and Brazil. It is 8 miles long and 8 broad; area, 35 sq. miles. A. was discovered by the Portuguese in 1501, on Ascension-Day, it is said, whence its name. It is of volcanic origin, rocky, and desolate, with one peak 2870 feet high. In 1815, when Napoleon was confined at St Helena, the English took possession of the still uninhabited island as an additional security against attempts to liberate their illustrious prisoner. Its productions are the tomato, castor-oil plant, and pepper; exports chiefly turtle and birds' eggs. Pop. about 400, mostly military.

Ascension, Right, in astronomy, is the arc of the equator intercepted between the first point of Aries and the point at which the circle of declination, passing through the star, inter-

sects the equator. It thus corresponds to longitude upon the earth. The old terms, *oblique ascension*, and *accusional difference*, were given respectively to the R. A. of the point of the equator which rose simultaneously with the body, and to the difference between the oblique and right ascensions.

For the method of determining R. A. see **TRANSIT INSTRUMENT**.

Ascension-Day, or **Holy Thursday**, an ecclesiastical festival in commemoration of the ascension of Christ, held on the second Thursday before Whitsunday. It has been observed, as some believe, from the 1st c. of the Christian era. The Roman Catholic and Anglican Churches still observe it. On A.-D. parochial processions were made to fix the boundaries, a practice still continued in some places. This was called *riding the marches*.

Asceticism is generally regarded at the present day as a peculiar product of Christianity, its advocates finding a complete justification of the practice, as well as the explanation of its prevalence, in Matt. xix. 21 and 1 Cor. vii. 37. But although it undoubtedly formed the foundation on which the systems of penance and monasticism were reared, its roots are to be found in certain beliefs regarding the nature of the universe and of man which prevailed before the origin of Christianity, and which were properly opposed to the spirit of that religion. It sprang, in short, from the belief, which was so characteristic of the Eastern systems of philosophy and religion, that all matter was essentially impure and evil; that the human soul, formed of the purest ether, was fettered by the impure body; and that the only means of purifying the soul and attaining to communion with God was deliverance from the contamination of matter, from flesh and lust. The practice to which this belief naturally gave rise was abstinence from all gratification of the senses and appetites, and a general mortification of the body. Accordingly practices of this kind, of various degrees of intensity, have prevailed among religious devotees in the East from a remote antiquity down to the present day.

The Jews were to some extent infected with dualistic notions during their captivity in Babylonia, and it is probably as an outcome of these that we find various ascetic practices among certain of their sects. A. was one of the characteristics of the Pharisees, and in a much more extreme degree of the Essenes. Ascetic practices were early developed in the Christian Church, the corruption in this direction being directly fostered by the influence of the Neo-Platonic philosophy, according to which a distinction was made between two modes of living—the one, 'according to nature,' for ordinary persons; the other, 'above nature,' for those who aspired to a higher degree of virtue. The rule prescribed for the latter was, that the soul ought to be withdrawn as far as possible from the debasing influence of the body, and that therefore all sensual gratifications were to be avoided, and the mind to be absorbed in contemplation. In imitation of this the Christian teachers, early in the 2d c., prescribed a twofold rule of holiness—the one lower, for ordinary persons; the other higher, for those who sought to attain to a higher standard of holiness here and higher glory hereafter. This, again, soon gave rise to a class of persons who professed to strive after that higher degree of holiness, and therefore supposed many things to be forbidden to them which ordinary Christians could enjoy, such as flesh, wine, matrimony, and business. They were called ascetics (Gr. *askētes*), from practising (*askēo*, to practise or exercise) severe religious exercises. Ascetics, then, were the genus from which sprang the different species, Monks (see **MONASTICISM**), Anchorites (q. v.), Cœnobites (q. v.), Eremites (q. v.), Stylites (q. v.), &c.

In the after-history of the Church, A., turning chiefly on celibacy, poverty, and mortification of the body, formed the basis of all the rules of the various orders of monks and friars, and also of penance, which occupied such an important place in the doctrine of the Church. The Reformation, the fundamental principle of which was that salvation is secured by justification through faith alone, and not through dead works, struck at the root of A. Nevertheless it has continued to manifest itself in various forms even among Protestants. The Shakers maintain the practice of celibacy, and generally among evangelical Christians crucifying the flesh, a phrase of Paul's which, like a great deal more of his language, has a remarkable affinity with the philosophy of the Alexandrian Philo, is regarded as a highly spiritual exercise.

Asch, a town in the W. of Bohemia, near the borders of Saxony and Bavaria, on the Ascha brook, at the foot of the Hainberg, with manufactures of cotton, linen, hosiery, woollens, leather, and paper. Pop. (1869) 9405.

Aachaffenburg, a town in the Bavarian circle of Lower Franconia, on the right bank of the Main, where it receives the Aschaff, 20 miles S.E. of Frankfort, and on the railway from Bamberg to Frankfort and Darmstadt. It is the seat of a court of appeal for Lower Franconia, and of various other government offices. A. is surrounded by walls, and the streets are steep and narrow, but the situation is pleasant; and the environs (e.g., the *Schönenthal*, the *Fasanerie*, the *Schöne Busch*, with a royal *Lustschloss* and orangery) are noted for their beauty. It is overlooked by the castle of Johannisberg, built by the Elector of Mainz (Johann Schweikhardt) between 1605 and 1614. A. was founded before the Roman invasion of Germany, and its municipal existence dates from before the 9th c. It has a collegiate church, founded in 974 by Otto I., Duke of Swabia and Bavaria, and a valuable library, rich in *incunabula* and copper engravings. The town has now considerable trade in wood, building-stone, tobacco, and wine; and its coloured papers are noted. In the war of 1866 it was the scene of a battle between the Prussians and the Austrians, in which the latter were defeated (July 14). Pop. (1872) 9212.

Ascham, Roger, a writer who merits equal praise for the purity of his English and the beauty of his Latin prose, was a native of Yorkshire, and was born at Kirkby-Wiske, near Northallerton, in 1515. At the age of fifteen he entered St John's College, Cambridge, then the most famous school of learning in England, and threw himself with ardour into the revolutionary movement in favour of the Greek classics which had now reached Cambridge. Though he had many brilliant contemporaries during his academic career, none became a more illustrious scholar. At the age of eighteen he took the degree of B.A.; was elected a fellow of his college a month later, and soon became the foremost Greek tutor of his day. From 1539 to 1541 he held a mathematical lectureship, but in spite of his great reputation for scholarship, the suspicion of heresy in religion—of Protestantism, in fact—appears to have at this period hindered his success, and for some years he was unhappy and straitened in his circumstances. But his letters show that he mixed himself up in every strife great and small that broke out in the university, and this may have added to his embarrassments. Meanwhile he had commenced his first work, *Toxophilus, the Schole of Shootinge conteyned in two Bookes*, which appeared in 1545 with a dedication to Henry VIII. The king granted him a pension of £10, and in the year following A. succeeded Cheke as public orator at Cambridge, in which capacity he had to write all the public letters of the university, a task for which he was eminently qualified, as he was one of the best penmen of his age, and acted as writing-master to Prince Edward and the Princess Elizabeth. During 1548-49 he was classical tutor to the latter, and in 1550 he proceeded to the Continent as secretary to the English embassy to the court of Charles V. Here he remained for three years, Augsburg being his headquarters, though some of his letters are dated from the Tyrol, Carinthia, and the Palatinate. The result of his foreign observations was his *Report and Discourse of the Affairs and State of Germany, and the Emperour Charles the Great*, probably written from Spire in 1552, in which year it was printed, and again in 1570. During the reactionary reign of Mary, A. not only managed to escape the ordeal of a 'recantation,' but actually obtained the office of secretary to the queen. Cardinal Pole, himself a fine scholar, admired and availed himself of A.'s accomplishments, and, in short, he was as great a favourite as if he had always been a sound Catholic. When Elizabeth ascended the throne, he was continued in his office; but in spite of a fair salary, a pension, a canonry, the lease of a farm, and other sources of income, his letters indicate a desire or a necessity for more money, the reason of which is not easy to ascertain. In 1563 he was invited to write the *Scholemaster* by Sir Richard Sackville, but left the work unfinished at his death, 30th December 1568. It was published by his widow in 1570, and has been frequently reprinted. By far the best edition is that of Mayor (Lond. 1863). Although an exquisite Latin scholar, as his letters and poems show, the fame of A. now depends on two

of his English works, the *Toxophilus* and the *Scholemaster*, the latter of which is incomparably the more important in regard to its matter. It is a treatise on the best methods of educating, with some excellent criticisms on Latin authors, and is written in unadorned, yet graphic and idiomatic, English. There have been two collections of his English works—one by Bennet (Lond. 1761), with a life by Dr Johnson, and another by Cochrane (Lond. 1835); but the best and the only complete edition of his entire writings is that by Dr Giles in the *Library of Old Authors* (Lond. 1865, 3 vols.).

Ascheraleben, a town of Prussia, province of Saxony, district of Magdeburg, on the Elbe, about 50 miles N.W. of Leipzig and 32 S. of Magdeburg. It is the chief town of a district of the same name, and has several industries of growing importance. Its chief manufactures are woollens, lincens, machinery, and paraffin oil, and it also possesses beetroot-sugar factories, breweries, and potteries. About 2 miles from A. is Wilhelmshof, and still nearer are some ruins erroneously supposed to be the remains of the old town of Askanien, the original home of the house of Anhalt. Pop. (1872) 16,734.

Asciáno, a town in the province of Siena, N. Italy, 12 miles S.E. of Siena, on the S. bank of the Ambrone. Pop. 2082.

Ascidian, the popular name applied to Molluscous animals belonging to the class *Tunicata*, and familiarly known as 'sea-squirts.' The genus *Ascidia*, which may be taken as a familiar and typical form, is represented by many examples on our shores. The name 'Ascidia' is derived from the Greek *askos*, a wine-bottle or wine-skin, and has been applied to these animals in allusion to the form of the body, enclosed in its *tunic* or investing sac, with its double apertures or 'necks.' The one neck or aperture corresponds to the mouth, which leads into a large ciliated chamber, the *branchial chamber* or breathing organ of these animals. The gullet and stomach are continued from this breathing chamber, the intestine terminating in a second sac or chamber lying parallel with the first, and known as the *atrial chamber*. Water is admitted to the branchial chamber for breathing purposes, and after being so used, passes to the atrial chamber, with which the breathing sac is in communication. The effete water of respiration is ejected from the branchial chamber by the second neck of the sac or second opening of the body, known as the *atrial aperture*. The water being sometimes expelled forcibly in a jet, has procured for these forms their popular name of 'sea-squirts.' Food is brought to the digestive system in the water admitted to the breathing sac. The heart exists as a simple tube, and is capable of propelling the blood either to or from the heart—the circulation being thus periodically reversed. Tentacles fringe the inner opening of the mouth. The nervous system consists of a single mass or ganglion of nervous matter lying between the two apertures of the body, and from this nerves radiate to the various tissues. These animals are found round our coasts, attached and rooted by one extremity to rocks and stones. Some species are of considerable size—one Mediterranean species (*Cynthia microcosmus*) being used for food. The outer *tunic* or coat of the body is composed in greater part of *cellulose*, a substance nearly identical with starch, and largely found in vegetables. The inner coat or *manle* is muscular, vascular, and highly contractile, and is the agency whereby jets of water are expelled. *Ascidians* may be *simple*, *social*, or *compound*. The young appear at first as swimming tadpole-like bodies, which sooner or later lose their tail, and fix themselves. The further structure and classification of these forms will be found in the articles MOLLUSCA and TUNICATA, &c.

Ascites, a term denoting a swollen, tense condition of the abdomen, due to the accumulation of an excessive quantity of watery fluid in the cavity of the serous membrane by which the abdomen is lined. This membrane is called the peritoneum. The blood circulating through the alimentary canal from the stomach to the rectum has to pass through the liver before it re-enters the general circulation. The veins of the abdominal viscera unite to form a great vein going to the liver, termed the *vena porta*. The *vena porta* conveys the blood to the liver, and from the liver it reaches the general circulation by another vein termed the *hepatic vein*. Any obstruction, therefore, to the flow of blood through the liver will speedily produce A., and any obstruction to the general circulation, by preventing blood from

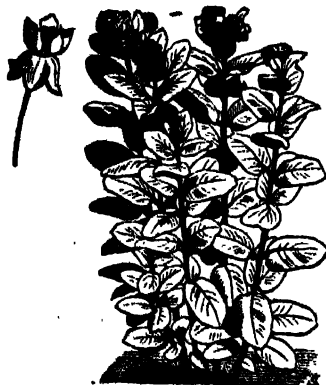
passing freely from the liver, will ultimately have the same effect. Accordingly A. may be caused by disease of the liver, by pressure on the portal or hepatic veins, by disease of the kidney, and by disease of the heart. The most common cause is disease of the liver. The treatment is to remove the cause if possible. If this cannot be done, temporary relief may be obtained by draining away the fluid by purgatives, or by stimulating the functions of the kidney. If the accumulation be so rapid as not to be quickly enough removed by these means, then it must be removed by tapping. This consists of pushing through the wall of the abdomen a cylindrical instrument called a trocar, having a sharp point, and carrying on it a tube known as a canula. The trocar is withdrawn and the canula left, and through it the fluid escapes. This may have to be done repeatedly. The relief is usually temporary, and the patient sinks from exhaustion.

Asclepiadaceæ, an order of Dicotyledonous plants, embracing fully 1000 species, inhabiting chiefly warm and tropical regions; but many extend to northern climates, although absent in Britain. The plants of the order have acrid, purgative, emetic, and diaphoretic properties. Many of them have a milky juice, which is usually bitter and acrid; but occasionally it is bland, and used as milk, as in the cow-plant of Ceylon (*Gymnema lactiferum*). The fragrant roots of *Hemidesmus Indicus* are used in Madras as a substitute for Sarsaparilla (q. v.). The bark of the root of several species of *Calotropis* furnishes a substance called Mudar (q. v.), which is used as a diaphoretic in India. *Cynanchum montepelliacum* furnishes Montpellier scammony, and *Periploca mauritiana* Bourbon scammony. These act as purgatives, and are used to adulterate true Scammony (q. v.). Various species of *Asclepias* (q. v.) are of economic value. The leaves of a species of *Solenostemma* are used to adulterate Alexandrian senna. See ARGEL. *Marsdenia tinctoria* and *Gymnema tingens* yield a dye like indigo. Species of *Stapelia* are called carrion flowers, from their fetid odour. *Hoya carnosa* is a beautiful climber, cultivated in hothouses under the name of wax-flower.

Asclepiades, a Greek physician, who flourished in the 1st c. B.C., but the precise date of whose birth or death is unknown. He was a native of Prusa, in Asia Minor, and finally settled at Rome. It is not wonderful that he proved a popular practitioner, for he maintained that a physician ought to cure his patients surely, swiftly, and agreeably. But if he was the first to recognise the distinction between chronic and acute diseases, he deserves to be honourably remembered in the history of his science. Gumpert has collected and edited the *Fragments of A.* (Weimar, 1798). A little poem, *Præcepta Sanitatis*, which has come down to us under his name, but which probably belongs to the 7th c., has been published by Welz (Wurz, 1841).

Another A., surnamed Sikelides, from his father, Sikelos, was the friend and contemporary of Theocritus. His name is attached to thirty-nine epigrams, mostly erotic, in the Greek anthology; and a certain kind of verse (of which Horace furnishes examples), beginning with a spondee and ending with an iambus, is named from A., *Asclepeidian verse*.

Asclepias, a genus of plants called swallow-worts, belonging to the order *Asclepiadaceæ* (q. v.). The species are mostly found in America, are Herbaceous plants, with milky juice, and are all more or less poisonous. *A. Syriaca* is misnamed, being a native of America, and not of Syria, as was supposed, and is commonly called Virginian swallow-wort. In Canada its young shoots are used as asparagus. *A. tuberosa*, butterfly-weed, or pleurisy-root, is used in N. America as a cathartic and diaphoretic. *A. Curassavica* is called wild ipecacuanha in the W. Indies, from its emetic properties. The *Soma* plant, referred to as an object of adoration in



Asclepias.

the Sanskrit Vedas, is supposed to be a species of A.

Ascoli (anc. *Asculum Picenum*), the capital of the province of Ascoli-Piceno, Central Italy, on the river Tevere, 16 miles W. from the Adriatic, and 15 N. of Teramo. It has a strong military position on the crest of a hill, with a splendid view towards the Apennines. Its chief manufactures are glass, majolica, silk, and leather, and its port, at the mouth of the Tronto, has considerable coasting trade. Pop. (1872) 22,937. A. was anciently the chief city of the Piceni, and was taken in 268 B.C. by the Romans. By the murder of Q. Servilius in 90 B.C., it gave the signal for the outbreak of the Social War, in which the town suffered severely. In 1426 Pope Clement V. united A. to the Papal States.

Another A., known as *A. di Satriano*, a town in the province of Foggia, on the E. slope of the Apennines, about 40 miles from Beneventum, is the ancient seat of a bishop, but is mainly famous as the scene of a great battle of two days' duration, B.C. 279, between Pyrrhus and the Roman consuls P. Sulpicius and P. Decius, in which the former was victorious, but with such heavy loss that he is reported to have said, 'Another such victory and I must return to Epirus alone.'

Aselli, **Asellio**, or **Asellius**, Gasparo, an Italian physician, was born at Ticino or Cremona about 1580, and died at Milan, February 14, 1626. His great merit lies in his discovery of the lacteal vessels, which he first observed while dissecting a living dog in 1622. His results were published by his friends and fellow-physicians, Alessandro Tadino and Septalius, in a book entitled *De Lactibus, seu Lacteis Venis, Quarto Vasorum Mesaraicorum Genere, Novo Invento, Dissertatio* (Mil. 1627).

Ases. See AESIR.

As'gill, John, pamphleteer, born about the middle of the 17th c., and studied at Lincoln's Inn. His penchant for pamphlet writing involved him in continual pecuniary embarrassments. In 1699 he passed over to Ireland, then filled with litigation arising from disputes as to forfeited estates, hoping to find scope for his legal talents; and in this he was not disappointed. He was soon after elected a member of the Irish Parliament, but was, four days after, expelled on the ground of blasphemy contained in a tract published in 1700, in which he had attempted to prove that 'man might be translated into eternal life without passing through death.' In 1705, returning to England, he was elected member for Ramber, in Sussex, but expelled 18th December 1707, for the same blasphemous allegation. The last thirty years of his life were spent between the Rules of the Fleet and of the King's Bench. He died in November 1738, getting up pamphlets to the last.

Ash, or **Ashes**. On the complete incineration of any organic body, either animal or vegetable, an incombustible A. always remains, to which the term A. is applied. The A. is as essential to the organised body as is the organic matter, and it is difficult to draw a clear line of separation between the two. Generally it may be said that organised matter is, or may be, derived from the atmosphere, whereas A. invariably comes from the earth. Compounds of potash, soda, and lime, with phosphoric and other acids, are the most abundant constituents of A. Potash (pot-ashes) is derived from the burning of wood, and when refined is commercially known as pearl-ashes.

Ash, the common name for the various species of *Fraxinus*, a genus of Dicotyledonous trees belonging to the order *Oleacea*. The common A. (*F. excelsior*) is a native of Britain, Europe, N. of Africa, and some parts of Asia. It grows to a height of 100 to 150 feet, is graceful in form and elegant in foliage; the latter is late in making its appearance, and falls off very early in autumn. The timber is very valuable, being white, hard, and tough, and is used for various purposes. There are several varieties which have been produced by cultivation, such as the curled-leaved A., the simple-leaved A., and the weeping A., originally derived from a single tree discovered about one hundred years ago growing in Cambridgeshire. The A. is the badge of the Clan Menzies, and has many superstitions connected with it. We have only space to refer to one very ancient usage, but one which was practised till recently in Warwickshire. Evelyn writes: 'I have heard it affirmed with great confidence, and upon experience, that the rupture to which many children are obnoxious, is healed by passing the infant through a wide cleft made in the bole or stem of a growing A. tree; it is then carried

a second time round the A., and caused to repress the same aperture as before. The rupture of the child being bound up, it is supposed to be in the cleft of the tree closes and coalesces. According to the Slavonian mythology, the first man and woman formed were *Asan* and *Ambla*, or A. and elm. The mountain A., or Rowan-tree (*R. v.*) of Scotland, belongs to a different order of plants. There are many species of A. found in America, such as the white A. (*F. Americana*); the red A. (*F. pubescens*); the water A. (*F. sambucifolia*); the blue A. (*F. quadrangulata*); the green A. (*F. juglandifolia*); and the Carolina A. (*F. Caroliniana*). These, and others, are all valuable timber-trees. On the shores of the Mediterranean, the small-leaved A. (*F. parvifolia*) and the lentisk A. (*F. lentiscifolia*) form graceful trees. The flowering A. (*F. ornus*, or *Ornus Europea* of some) of the S. of Europe is commonly called manna A. from the saccharine substance it yields, commercially known as Manna (*q. v.*).

Ashanti', or **Ashantee**, the most powerful native kingdom of Guinea, W. Africa, is bounded W. by the river Assinie, E. by the Volta, N. by the Kong Mountain, and S. by the S. Atlantic Ocean. Lat. some 6° to 8° N.; long. 5° W. to 1° E. Area, 72,000 sq. miles; pop. about 400,000. It is in great part hilly, well watered, and covered with dense tropical vegetation. The climate is unhealthy; from April till November the rains are almost unceasing, but during the remainder of the year the northerly or inland wind (*harmattan*) brings the 'healthy season.' Along the coast tropical diseases are common, but inland, where the country undulates, it is much healthier. The cutting of roads through the impenetrable jungle of bamboo and brushwood with which A. is overgrown, is a task of great difficulty, and communication is therefore defective. The chief natural products are maize, millet, rice, yams, tobacco, sugar, cotton, gums, dye-woods, the pine-apple and other fruits. Coomassie (*q. v.*) is the chief town. There is a considerable export of gold-dust and palm-oil. The natives are well made, intelligent, and warlike, and are skilled in the manufacture of cottons, sword-blades, gold ornaments, and earthenware. They are almost entirely fetish worshippers, indulging largely in human sacrifice, but there is also a sprinkling of Mohammedans. The early history of A. consists of vague and uncertain traditions. In the beginning of the present century the country had risen to considerable importance, embracing not fewer than forty-seven conquered states, chief of which were Akim, Assin, Sanem, and Wassau. In 1807 the Ashantis defeated the Fantees, who inhabited a region near Cape Coast Castle, afterwards attacked the Dutch and English, and were completely repulsed by a strong English force in 1826. The cession of the Dutch forts to Britain led to another collision in 1873, but A., despite strong natural defences, was quite unable to resist an English expedition. Sir Garnet Wolseley, at the head of a force of 1600 men, marched on Coomassie, routed the enemy, and before returning to the coast burned the capital. King Coffee Calcali, ruler of A., finally surrendered, and a treaty was signed by which England was to receive 50,000 ounces of gold as war indemnity. Later events seem to confirm the fear that A. in her feeble state will fall a prey to some of the more savage tribes by which she is surrounded. See Sir Charles Adley's *Colonial Policy*; *Fanti and Ashanti*, by Captains Brackenbury and Wilson; and the *Edinburgh Review* for October 1871.

Ashbourne, a market town in the W. of Derbyshire, on the Dove, with manufactures of cotton, lace, and iron, and an active trade in cheese and malts. It has a cruciform church, built in 1241, with a fine spire 212 feet high. The troops of Charles I. were defeated at A. in 1644 by the forces of the Parliament. Pop. (1871) 2083.

Ashburton, Lord (Alexander Baring), born October 27, 1774. He was trained to commerce in the Canadas and the United States, and in 1810 became head of the great house of Baring Brothers & Co. He was elected M.P. for Taunton in 1812, and for N. Essex in 1832; was President of the Board of Trade and Master of the Mint in the Peel Administration of 1834-35; created Baron A. 1835; and in 1842 was appointed special Ambassador to the United States to settle the N.W. boundary, which was fixed by the treaty of Washington in August of that year, somewhat to the advantage of the United States. Provisions were made in it for abolishing the African

slave trade, and for the extradition of suspected criminals. A. died 13th May 1848, and was succeeded in the title by William Bingham Baring, his eldest son, who was born 1799; educated at Oxford; elected member for Taunton 1836; appointed Secretary to the Board of Control 1841, Paymaster-General of the Forces and Treasurer of the Navy 1845, and President of the Geographical Society 1860. He died March 23, 1864.

Ashburton, a small town in the S. of Devonshire, 16 miles S.W. of Exeter, with considerable copper and tin mines, slate quarries, and serge manufacture. It has a cruciform church in the Perpendicular style. Pop. (1871) 2335.

Ashby-de-la-Zou'ch, a market town in the N.W. of Leicestershire, on the Mcase, a branch of the Trent, 15 miles S. of Derby. It has some leather, hat, and hosiery manufactures, and considerable iron-smelting. Near it are extensive mines of coal, lead, ironstone, and limestone. The ruined castle of A., built in the reign of Edward IV., was for some time the prison of Mary Queen of Scots. The church of St Helen here contains the tombs of the Hastings and Huntingdon families, including that of Selina, Countess of Huntingdon, founder of the religious sect named after her. Pop. (1871) 7302.

Ashdod. See AZOTUS.

Ashera, a goddess referred to in the Old Testament, although the name is always translated 'grove' in the authorised version. In numerous passages 'grove' (*i.e.*, holy wood) means a wooden object, generally close to the altar of Baal (Judges vi. 25; see 'grove' in authorised version); this was undoubtedly the *linga* or phallic symbol, represented by a tree stripped of its branches, or a tree-stem driven into the ground. But in several other passages it is evidently used as the proper name of a goddess. In Judges iii. 7, *e.g.*, analogy requires it, thus: 'the baals and the groves,' = Baalim and Asheras; Manasseh, as well as the mother of Asa, made an *image* for A. (1 Kings xv. 13; 2 Kings xxi. 7); and in 1 Kings xviii. 19, mention is made of priests of A. along with those of Baal. A. represented the female side of Baal—Baal'tis, or Mylitta, and therefore was served along with Baal (Judges vi. 25). She is not to be confounded, however, with Astarte or Ashtoreth (*pl.* Ashtaroth), notwithstanding Judges ii. 13; x. 6; 1 Sam. vii. 4; xii. 10, where the latter is put in conjunction with Baal. In all the other passages Ashtoreth and A. are kept distinct; and on closer investigation their characters are found to be quite distinct and even antagonistic. Astarte was the moon-goddess, as appears from Ashteroth-Karnaim, the name of a trans-Jordanic city (Gen. xiv. 5, and Deut. i. 4), meaning 'Ashteroth of the two horns,' *i.e.*, of the crescent moon. She was at any rate a severely chaste goddess, probably the same as the 'queen of heaven,' whose worship by the Israelitish women was approved by their husbands (Jer. vii. 18; xlv. 15). The worship of A., on the contrary, was of the most unchaste description; the special service of her priests and priestesses being to prostitute themselves for hire to her worshippers (Deut. xxiii. 17, 18; 2 Kings xxiii. 7).

Ashford, a market town of Kent, on the Esse, a branch of the river Stour, 14 miles S.W. of Canterbury. It has a Gothic church, and is now an important railway junction, with some damask and linen manufactures. Pop. (1871) 8458.

Ashlar, in architecture or masonry, is the name given to any kind of squared and polished building-stone, as distinguished from the undressed rubble of the quarries.

Ashley, Lord. See SHAFTESBURY, EARL OF.

Ashmole, Elias, antiquary, born at Lichfield, 23d May 1617, and became a Chancery solicitor in 1638. In the civil wars he joined the Royalists, and was a captain in Ashley's regiment, studying at the same time mathematics and astrology at Oxford. In 1646 he became intimate with the great astrologers Lilly, Moore, and Booker; married Lady Mainwaring in 1649; and in 1650 published, under the feigned name of Hasalle, his *Fasciculus Chemicus, or Chemical Collections, expressing the Ingress, Progress, and Egress of the Secret Hermetic Science*. Two years later appeared his *Theatrum Chymicum Britannicum*, which procured for him the friendship of Selden. He next devoted himself to antiquarian studies, of which a valuable result is his *History of the Order of the Garter* (1672); and in 1682 he pre-

presented Oxford with a valuable collection of curiosities, given to him by a family named Tradescant, to which he added many collected by himself. This is named the Ashmolean Museum. A. left a diary containing a minute account of his life, which was published at London in 1774. He died May 18, 1692.

Ash'mun, Jehu'di, born at Champlain, New York, in 1794, educated for the ministry, held for a short time a professorship in the theological seminary of Bangor, Maine, and then became editor of the *Repertory*, a Washington monthly magazine. As agent of the African Colonization Society, he conducted a band of liberated negroes from Baltimore to Liberia, landing at Cape Mesurado 8th August 1822. After six years assiduously devoted to the task of establishing the colony on a solid basis, his health gave way, and returning to America, he died at Newhaven, Connecticut, 10th August 1828. See Gurley's *Memoir of A* (Washington, 1835.)

Ashtabula, a post town in the county of the same name, State of Ohio, N. America, 3 miles from Lake Erie. A. has an active commerce, and is rapidly increasing. Pop. 3394.

Ashton-in-Makerfield, a township of S. Lancashire, with extensive collieries, potteries, and cotton-mills. Wigan is its post town. Pop. (1871) 7463.

Ash'ton-under-Line, a town in the S. E. of Lancashire, on the river Jame, 6 miles E. of Manchester, with which it is connected by two canals and by railway. There are several handsome municipal buildings and numerous churches. One of the oldest buildings is the Manor Hall, ancient seat of the Asshetons. The chief employment is the cotton manufacture; but there is also bleaching, dyeing, calico-printing, engineering, and brickmaking. Near A. is a large bog, abounding in black oak and resinous fir trees. Pop. (1871) 37,389.

Ash'toreth. See ASTARTE.

Ash-Wednesday, the first day of Lent, derives its name from the practice in the Roman Catholic Church of the priest's making on that day the sign of the cross on the forehead of the people with the ashes of the palms that had been consecrated on previous Palm-Sunday. He made use of this formula: *Memento, homo, quod cinis es, et in cinerem reverteris* ('Remember, man, that thou art ashes, and shalt return to ashes'). This custom, of very ancient standing, was sanctioned by the Council of Beneventum, 1091. In the Anglican Church the communion service is read on A. The Protestant Churches of the Continent do not celebrate it, but in some parts of N. Germany a memorial of it survives in a children's pastime called *Asche-abkehren* ('ash-brushing').

Asia, the most extensive of the great divisions of the globe, lies in the eastern hemisphere, and extends over fully 180 degrees of longitude, for the most part within the temperate zone. It forms at least four-fifths of the continent of the Old World, being fully four times the size of Europe, and in the S. E. is fringed by a numerous group of islands. Its area is estimated at about 20,000,000 sq. miles; pop. nearly 850,000,000. In reference to population, it may be noticed that not only is it the most populous continent, but that it contains more people than all the rest of the globe. In fact, it supports two-thirds of the human race. China and India are the most densely, Siberia the most sparsely, peopled regions. On the W. side it is partly connected with Europe and Africa, but otherwise is surrounded by the ocean. It is bounded N. by the Arctic Ocean, E. by the Pacific, S. by the Indian Ocean, and W. by Europe, the Black Sea, the Mediterranean, and the Red Sea. In the S. W. it is joined to Africa by the Isthmus of Suez, and in the extreme N. E. is only separated by Behring's Strait from N. America. Its greatest length, from Singapore to the N. E. cape of Siberia, is 5300 miles; breadth, from Smyrna to Japan, 6000 miles. 'The mass of the continent is nearly a square, with seven great projections stretching out from it in the form of peninsulas—viz., Europe and Asia Minor on the W.; Hindustan and Further India on the S.; Corea and N. E. Siberia on the E. It is a curious fact that each of these great projections has a smaller peninsula or island closely connected with it. Thus Europe has the British Isles; Asia Minor, the *Ægean-Archipelago*; Arabia has Oman; Hindustan has Ceylon; Further India has the Malay Peninsula; Corea has Japan; while N. E. Siberia has Kamchatka.'

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The political divisions, with their area and population, as given by the latest authorities (1869-73), are

State.	Area in sq. miles.	Population.
Arabia, Chinese Empire, including China Proper, Dependencies of Mongolia, Tibet, Corea, Manchuria (estimated 1873), Japan (1873), Further India (i.e., beyond the Ganges)—Anam or Cochín-China, with Tonquin and part of Cambodia, Burmah, Siam, E. Indian Islands, Afghanistan and Herat, Beloochistan, Turkistan—Bokhara, Khokan, Maymene, Turcomania, Khiva, Persia or Iran (estimated 1872), British Possessions in Asia—Hindustan (1872)—Under Gov.-General of India, Lieut.-Gov. of Bengal, " " of N. W. Prov., " " of Punjab, " Chief-Com. of Oude, " " of Cent. Prov., " Governor of Madras, " " of Bombay, Native States—Under Gov.-General of India, Lieut.-Gov. of Bengal, " " of N. W. Prov., " " of Punjab, " Chief-Com. of Cent. Prov., " Governor of Madras, " " of Bombay, Ceylon (1871), Further India—British Burmah (1872), Straits Settlements (Singapore) Penang, and the province of Wellesley, Chén, Japan—Labuan, Hong Kong, French Possessions in India—Cochin-China, Chandernagore, Karikal, Mahe, Pondicherry, Portuguese Asia—Paulim, Damau, Diu, Settlements in the islands, Solor, Timor, and Midora, Macao (China), Russian Asia—Siberia, Caucasus, Turkistan, Ottoman Asia—Anatolia (Asia Minor), Syria, Mesopotamia, Kurdistan,	2,095,000 4,700,000 140,399 198,043 190,517 309,024 190,359 258,530 165,830 640,516 562,344 48,709 248,231 80,901 102,001 23,073 84,164 141,746 127,532 385,206 79,156 5390 43,877 28,399 31,953 72,076 24,454 93,664 1,206 45 32 21,748 5,400,000 67,000 ... 820,000 450,870	3,000,000 425,146,530 33,110,825 9,000,000 4,000,000 6,298,990 27,164,728 4,000,000 8,000,000 2,500,000 3,000,000 200,000 770,000 1,500,000 5,000,000 7,887,537 66,856,859 30,769,056 17,596,752 11,240,747 9,066,019 31,311,148 14,042,506 27,716,352 2,139,505 1,284,601 5,086,502 1,095,275 2,374,333 6,552,170 2,405,287 2,562,323 308,097 4,898 120,124 979,116 29,000 15,000 4,000 44,000 34,000 ... 35,000 4,623,699 4,137,917 ... 10,700,000 4,450,000

The physical geography of A. is singularly interesting. This vast continent contains at once the widest plains and the highest mountain peaks in the world. It stretches far into the Arctic circle, and penetrates the tropics by three great peninsulas, thus embracing the utmost extreme of climates. Its mountains, plains, and river systems may be best considered separately.

The great mountain chains of Central A. are four in number—(1) The Himalayan range (q. v.), separating India from Tibet, and extending from the Bolor Tagh to the grand curve of the Brahmaputra, whence it branches off into the lower ranges of China and Further India; (2) The ranges which stretch from the Bolor Tagh to Behring's Strait, and from the N. E. boundary of the central plateau, including the Thian Shan in Kashgaria, the Altai and Sayansk in S. Siberia, and the Stanovoi and Aldan ranges in E. Siberia; (3) The Hindu Kush range, between Afghanistan and Turkistan, running W. from the Bolor Tagh, and finding its continuation in the Elbruz Mountains S. of the Caspian, the mountains of Armenia, and the Taurus range; (4)

The ranges forming the southern boundary of the central plateau, the chief of which are the Karakoum and Kuenlun Mountains of Tibet; Pe-ling, Yun-ling, and Nan-ling in China, Inshar and Kinghan S. and E. of the Shamo desert. In addition to the main series there are lesser ranges, such as the Suliman and Hala Mountains, separating India from Afghanistan and Beloochistan, and forming the E., as the Zagros or Kurdistan Mountains form the W. wall of the plateau of Iran, the Eastern and Western Ghats of India, and the Ural Mountains, which in part separate Asia and Europe. Away to the S.W. again, the Arabian mountains may be considered as forming a link of connection with the lofty snow-clad mountains of Africa, lying beyond Abyssinia. The mean height of the Himalayas greatly exceeds that of any other mountain range, being variously estimated at from 12,000 to 20,000 feet; certainly not fewer than forty peaks are over 21,000 feet, and a considerable number of them are above 25,000. This range contains the loftiest known point on the globe, Mount Everest, which towers to the gigantic height of 29,006 feet. The snow-line is exceedingly high on the Himalayas, and on the S. side the descent to the narrow valleys or gorges is extremely precipitous. There are comparatively few passes, and all have a great altitude; several are higher than Mont Blanc, and one is estimated at 20,000 feet. To the N. of the main range many of the peaks are volcanic; the higher mountains, however, are either of granite, gneiss, or quartzite.

The two great plains of A., the Eastern and Western, are tablelands. The latter, called the Plateau of Iran, has an estimated area of 1,700,000 sq. miles, and a general elevation of 4000 feet, the salt desert of Persia and the tablelands of Armenia being nearly double that altitude. This vast region, together with that of Arabia, is singularly arid and barren, being rarely varied by the appearance of vegetation. The great Eastern Plateau or tableland of Tibet lies N. of the Himalayas. It includes over 3,500,000 sq. miles, and is traversed by several large rivers. This enormous tract, which is little known, is of great height (17,000 feet) in the S., and descends towards the mountain range forming its N. boundary. A lowland plain occupies the entire N.W. of A., embracing W. Siberia and W. Turkestan, with an area nearly double that of Europe. The southern part of India forms the tableland of the Deccan, which is bounded on the E. and W. by the Ghats, or hill ranges of the coast.

The river systems of A. are on the same grand scale as its mountains and plains. They may be divided into three separate series: those which flow into the Arctic Ocean, those which enter the Pacific, and those which drain into the Indian Ocean. Of the first class there are nine large rivers, the chief of which are the Lena, Yenesei, and the Obi, each having a direct course of nearly 1500 miles, without including windings, and draining nearly half a million sq. miles of territory. They all rise at very inconsiderable elevations in the Altai Mountains, pass through immense desolate plains, have sluggish courses, and form occasionally vast marshes, which occupy a great part of Siberia. The deltas formed by the Lena and Yenesei are frozen for nine months annually; and the latter river, in its upper course, expands into the great Lake Baikal. Of rivers that flow into the Pacific the chief are the Hoang-ho and Yang-tse-kiang, each with a course of 1200 miles, not including windings. They both rise in Central Asia, drain about half a million of sq. miles, and carry down a great amount of mud, which is deposited at their mouths in the Yellow Sea. The next largest river is the Amur, which, with a drainage even greater than that of the two former rivers, forms a part of the southern boundary of the Russian dominions, and enters the Sea of Okhotsk. The rivers which empty into the Indian Ocean—the Ganges, Brahmaputra, Irawaddy, and Indus—are inferior to those of Northern A. in everything but historical interest and commercial importance. A singular double river system is formed by the Ganges and Brahmaputra, which both rise in the Himalayas and unite their voluminous waters to form an immense delta covered with the densest jungle vegetation. The Euphrates and Tigris, rising in the tableland of Armenia, also combine before entering the Persian Gulf. In addition to rivers which flow into the ocean, there are several in Central A. which have no drainage beyond the high tableland, and no outlet except the lakes, where their superfluous water is carried off by evaporation. The chief of these, the Amur-Daria (anc. Oxus), rises in the Hindu Kush, and enters the Sea of Aral after a course of about 1700 miles.

The lakes are few, and mostly of inferior dimensions. There are several of large size, however, the principal of which are the Caspian Sea, the largest lake in the world; Lake Aral, in the steppes of Turkestan; and Lakes Baikal and Balkash, the former in the S. of Siberia, the latter at the eastern edge of the steppes of the Kirghis. In the tableland of Chinese Tartary are Lob-nor and Koko-nor; in Tibet, Tengri-nor; in the basin of the Yang-tse, Lakes Poyang and Tong-ting; in Iran, Lakes Hamun and Urmiah or Urumiyah; in Armenia, Lake Van; in Syria, Galilee and the Dead Sea; and Tüz-Göl in Asia Minor. Several of these are salt—Tüz-Göl being reputed the saltiest in the world.

In metals A. is exceedingly rich, having indeed been celebrated from the remotest times for the profusion of its mineral wealth. The precious metals are distributed more liberally than in Europe, especially in China, the Altai and Ural Mountains, India and Burmah, and are associated with diamonds. In the Altai and Urals, iron, lead, and platinum are found; in India and Mongolia, rubies and other gems; salt in Central A.; coal in various places; petroleum in the Caspian region; and bitumen in Syria. The E. of Turkestan abounds in silver, lead, copper, iron-ore, sulphur, coal, besides jasper and turquoise.

The botany of A. is unsurpassed in richness and variety by that of any other continent, and ranges from the scant flora of the circumpolar region to the prodigal vegetation of the tropics. The southern zone is especially notable for the number of its native fruits and esculent vegetables, India, Indo-China, and Arabia abounding in trees yielding gums, spices, balsams, resins, and dyes. Among the more characteristic specimens may be mentioned the birches, willows, larches, and stone pines of N. Siberia; the root plants of Central A., including rhubarb, angelica, and cow-parsnip; the palm, date, fig, cedar, banian, and other S. Asiatic trees; and the nutmegs, cloves, and other spices peculiar to the Eastern Archipelago. China and Japan are famous for the cultivation of tea, and India for the production of rice, cotton, coffee, opium, indigo, and maize.

The zoology embraces one-third of all known quadrupeds, including a large variety of wild animals of great strength. Bears, lions, tigers, rhinoceroses, leopards, are the chief of these; besides which there are the badger, wolf, Arctic fox, hyæna, jackal, and monkey. Among the domestic animals are the ox, buffalo, sheep, goat, horse, ass, camel, elephant, and dog. Birds and reptiles are very numerous: of the former may be mentioned the peacock, pheasant, bird of paradise, besides numerous singing-birds; of the latter, the boa-constrictor, python, cobra, crocodile, &c. The insects are of large size and splendid tints.

The principal islands are those in the S.E., known unitedly as Malaysia, or as the Eastern, Indian, or Asiatic Archipelago, and comprising five principal groups: (1) The Sunda Islands (Java, Sumatra, &c.); (2) the Celebes, including the Sangir group; (3) the Moluccas or Spice Islands; (4) the Philippines; (5) Borneo, including the Sulu group. Borneo is the largest island in the world. Other islands of A. are Ceylon, in the S. of India; the Japanese Islands, E. and N. of Corea; Formosa, E. of China; Cyprus, S. of Asia Minor; and New Siberia, in the Arctic Ocean.

In a political aspect the various countries of A. present a curious combination. The forms of government range from the primitive rule of the nomad sheik to Chinese despotism, while the wandering tribes of Siberia and Turkestan remain almost un-governed by the Russian Czar, who claims them as his subjects. The vast territory of India has been brought by British government directly under European influence, and Japan is freely modelling her institutions on those of the West. The great political power of A. belongs, however, to the past. In ancient times it embraced many powerful monarchies, the chief of which were those of Assyria and Persia. The Huns, who overran Europe in the 5th c., issued from a region E. of the Caspian Sea; the fanatical armies of Arabia conquered the greater part of the ancient world; and the Osmanli, who rose on the ruins of the Seljukide Turks, of whom they were merely a sept, overthrew the Roman empire in the East and established the Turkish dynasty. But, with some brilliant exceptions, the Oriental governments for the last two hundred years have either remained stationary or have lapsed into feebleness and decay.

As to ethnography, the entire population of A. embraces three main groups, the Turanian (q. v.), Aryan (q. v.), and Semitic (q. v.). The peoples in the N., E., and S.E. of A. are Turanian; those of Northern India, Afghanistan, Persia, and

a portion of Asiatic Turkey are Aryan; and the inhabitants of Arabia, Palestine, and Syria belong to the Semitic family of races.

The religions of A. are numerous and diverse. The most important are the Brahminism of India, the religions of Buddha, Confucius (if his system of practical ethics, *minus* a deity, can be called a religion), and Lao-tse in China, and the various forms of Islamism in Arabia, Persia, and India. There are, besides, many native Christian sects in India, Armenia, Kurdistan, and Syria. The subject of religion is dealt with in the articles on the various religious creeds.

In point of civilisation many of the countries of A. had in the earliest times made great industrial and intellectual progress. Many of the arts originated in A., which is regarded as the birthplace of humanity itself. The history of Eastern civilisation, however, exhibits a singular phase. Development entirely ceases after a certain stage has been reached in the evolution of art, science, industry, law, and commerce; conservatism then becomes the ruling principle, and the result is what is seen in the rigid and unchanging systems of India and China, though the former country shows signs of awakening from its long intellectual slumber, and may perhaps again reach distinction, if its educated youth do not lapse into mere scientific scepticism. The Arabs, Turks, and Persians still retain slavery; Hindu society is fixed by a rigorous system of *caste*; but in China there prevails civil and political equality in a sense, *i.e.*, there is no aristocracy to modify the absolute despotism of the imperial rule, all being thus alike powerless.

Asia'go, a town in the province of Vicenza, N. Italy, 22 miles N. of Vicenza, noted for the manufacture of straw hats, and for turning. The inhabitants speak a corrupt form of German. Pop. 5140.

Asia Minor, the ancient name of the modern Anatolia, a district of great historical interest, as having contained some of the most famous cities of the ancient world—Troy, Ephesus, Smyrna, &c. On this theatre were transacted events of the greatest magnitude and interest, as the wars of the Greeks with the Persians; of the Romans with Mithridates; and the more recent contests of the Arabs and Turks with the decaying Empire of the East—events stretching over a period of more than 2000 years. Under Turkish rule A. M. has gradually lapsed into poverty, sterility, and barbarism, in striking contrast to its wealth, fertility, and civilisation in earlier ages. The most important countries of A. M. in ancient times were Ionia, Phrygia, Lydia, Cilicia, Galatia, Bithynia, Pontus, and Cappadocia.

Asiat'ic Chol'era. See CHOLERA.

Asinalun'ga, or **Sina Longa**, a well-built town in the province of Siena, N. Italy, 22 miles S.E. of Siena, with a fine collegiate church, containing several valuable paintings. Pop. of commune, 8500.

Asmannshau'sen, a village in the Prussian province of Wiesbaden, on the Rhine, famed for the splendid wines to which it gives name. The ducal vineyards here yield red wine superior in some respects to those of Burgundy.

Asmode'us (Heb. *Ashmedai*, the destroyer) figures in the Book of Tobit as an evil spirit, who slew in succession the seven husbands of Sara on the bridal night. Tobias burned the heart and liver of a fish caught in the Tigris, the smell of which forced A. to flee into Egypt, where the angel bound him. According to the Talmud he drove Solomon from his kingdom, and for this he was afterwards forced to serve in building the temple.

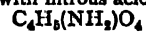
Asmon'e'ana. See MACCABEES.

Aso'la, an ancient fortified town in the province of Brescia, N. Italy, 19 miles W.N.W. of Mantua, known for its manufacture of silk-twist. Pop. of commune, 5500.

Asp, the name of a poisonous serpent, the zoological position of which is but doubtfully indicated. The term appears to have been used by popular authors and writers in a very general sense. It is supposed to correspond to the *Naja Haje* of Egypt, a snake allied to the famous *Naja tripudians*, or *Cobra di Capello* of India. See NAJA. By other naturalists the A. is believed to be one of the *Viperidae*, or vipers; the *Cerastes*, or horned snake of Egypt, and the *Vipera Echis* being two of the forms thus suggested. The former is regarded as the snake or

A. by aid of which Cleopatra wrought her tragic end. The A. or *Vipera Aspis* of the Alps, Sicily, and S.E. Europe generally, is another form to which the term A. is applied. This latter has a broad head, and somewhat resembles the common viper in appearance.

Asparagine is a crystalline substance occurring in the young shoots of the asparagus, also in the climbing vetch, marsh-mallow, bean, pea, and other plants. It is related chemically to malic acid, and may be converted into that substance by treating it with nitrous acid.



Asparagine.



Malic acid.

Asparagus, a genus of Monocotyledonous plants belonging to the order *Liliaceæ*. *A. officinalis*, common A., is a Herbaceous plant indigenous to Britain; and in the southern parts of Russia and Poland it grows so abundantly that cattle and horses eat it as grass: it is also found in Greece, and was formerly used as a vegetable by the Romans. In some parts of England it is cultivated extensively for the London market: the young shoots alone are used as a culinary vegetable. Both the shoots and roots are diuretic, and have been beneficial in cases of gravel and dropsy. The seeds of the plant have been used as a substitute for coffee, and a kind of spirit has been made from its berries. *A. albus*, and other species found in the S. of Europe, are used in the same way as the common A. *A. scaber* is not used, owing to its bitter properties. *Prussian A.* is the young shoots of a plant belonging to a different genus—viz., *Ornithogalum pyrenaicum*, which grows abundantly in some parts of Somersetshire, especially near Bath.

Asparagus Stone. See APATITE.

Aspa'sia, a Milesian, daughter of Axiochus, possessed rare mental accomplishments. Coming to reside at Athens, her beauty and culture fixed the affections of Pericles, who had parted from his wife with her own consent. His union with A. was as close as the law permitted, marriage with a foreign woman being strictly prohibited. Her ascendancy over Pericles was supreme, and her house became the rendezvous of the most polished society of Athens. The comic writers were habitually unjust to her, falsely ascribing to her influence both the Samian and Peloponnesian wars. In the *Menæxenus* of Plato there is a discourse composed by A. in honour of the soldiers who died for their country at Lechæum, of which Cicero says that the Athenians were so proud that they caused it to be declaimed once a year, and adds that the custom prevailed to his own time. On the death of Pericles she attached herself to Lysicles, a cattle-dealer, whom she succeeded in moulding into a brilliant orator. Her son by Pericles, legitimated by a decree of the people, assumed his father's name. See Plutarch's *Life of Pericles*.

As'pé, a town in the province of Alicante, Spain, 21 miles W. of Alicante, with flour and oil mills, a trade in wine and brandy, and soap manufactories. Pop. 6744.

As'pect is an old astronomical term, now completely disused, applied to the position of one planet with respect to another, as seen from the earth. There were five aspects, which received distinct names: *Conjunction* (symbol ☿), when the two bodies had the same longitude; *Sextile* (*), when they were 60° apart; *Quartile* (☐), when 90°; *Trine* (Δ), when 120°; and *Opposition* (☾), when 180°. Conjunction and opposition are the only two now in use.

As'pen, or **Trembling Poplar**, the common names for *Populus tremula*, a tree native in Britain, many parts of Europe, and Siberia. It is common in damp soil in the Highlands of Scotland, ascending to 1500 feet above the level of the sea. It has received its name from the leaves having a quivering motion, caused by the petioles or leaf-stalks being flattened or compressed laterally, so that the slightest breath of wind moves the leaf. The wood, which is white, light, and soft, has been used for a variety of purposes. The smaller branches make good gunpowder charcoal. It is a fast-growing tree, with a smooth, greyish bark, and is supposed to be the mulberry-tree of Scripture, referred to in 2 Sam. v. 24, and 1 Chron. xiv. 15. It belongs to the natural order *Amentifera*, or the Willow family.

Aspergillum, or **Watering-Pot Shell**, a genus of *Lamelibranchiate Mollusca*, in which the body is contained within a calcareous or limy tube, formed by the calcified siphons or breathing-tubes. The two valves of the shell consist of two small structures embedded in the front part of the tube. The tube, at the anterior portion, terminates in a perforated disc, like the 'rose' of a watering-pot—hence the popular name of these forms—and its opposite extremity often possesses ruffle-like folds. These animals bore into sand, or burrow in stone or wood; the elongated tube serving to convey water and food to the enclosed animal. *A. Javanum* and *A. vaginiferum* are familiar species.

Aspergillus, a genus of Filamentous fungi. See MOULD.

As'pern, or **Gross As'pern**, a village 5 miles E. of Vienna, on the left bank of the Danube, famous for a battle in 1809 between the French and the Austrians. The French, under Napoleon I., entered Vienna on the 12th of May, and on the 21st began crossing the river to attack the Archduke Charles, who had posted his forces on the opposite bank. The Austrians charged the French with the utmost fury, but the day's combat was not decisive. Renewing the attack next morning, the Austrians forced the French, after an obstinate resistance, to withdraw, first to the island of Lobau, in the middle of the river, and afterwards to the right bank, with a loss in killed and wounded of more than 30,000. Marshal Lannes was among the slain.

Asperula, a genus of Dicotyledonous plants belonging to the order *Rubiaceæ*. See WOODRUFF.

As'phalt, **Asphaltum**, **Bitu'men**, or **Min'eral Pitch**, is a solid amorphous mineral, resembling common pitch, found abundantly in almost every quarter of the globe. Many theories exist regarding its origin, but that most generally received holds it to be the product of the distillation of carbonised vegetable matter by the action of subterranean heat and moisture in the absence of atmospheric air. The existence of naphtha, petroleum, and allied mineral substances, is ascribed to the same cause. B. occurs in nature in three distinct forms—the earthy, the elastic, and the compact. They are all readily inflammable, and possess a black or brownish-black colour, with a specific gravity from 1 to 1.6, according to the amount of impurities present. B., when pure, however, has a density rather less than water. Earthy B. breaks with a rugged edge; and the soft, flexible, or elastic variety, sometimes called 'mineral caoutchouc,' from its capability of removing lead-pencil markings, is extremely rare. The compact variety, commonly termed A., is the most abundant kind. It fractures conchoidally, with a brilliant resinous lustre; fuses at 212° F.; burns with a thick red smoke; and when rubbed, emits a pitchy odour. It is insoluble in water, partly soluble in alcohol and ether, and almost wholly so in spirit of turpentine. According to Boussingault, it is composed principally of an oxygenated hydrocarbon, called by that investigator *asphaltene*. The largest known asphaltic deposit occurs in the island of Trinidad, where there is a lake of it 1½ miles in circuit. It also exists abundantly in Barbadoes, Cuba, New Grenada, Peru, United States, Canada, and New Brunswick—the A. of the latter place being called *albertite*. Burmah, Turkey in Asia, France, Albania, and many other European localities, also furnish considerable quantities. After an earthquake, large masses of A. are found floating on the surface of the Dead Sea (the *Lacus Asphaltites* of classical authors), which circumstance seems to point to the existence of bituminous springs in the bed of the sea, probably identical with the 'slime-pits' of the Vale of Siddim. From the earliest historic times A. has been used for various purposes. The Egyptians employed it in embalming the dead; and bricks from Babylon exhibit adherent bitumen, indicating its use as mortar. At the present time it is turned to account in the preparation of artificial pavement, as a covering for roofs, and a lining for cisterns and iron pipes; it also forms the principal ingredient in Japan varnish. —**A. Stone** is a dark-brown compact limestone, impregnated with from 6 to 10 per cent. of B., found at Seyssel, department of Ain, France; in the Val de Travers, canton of Neuchâtel, Switzerland; and other places in the Jura Mountains. Its suitability for roadways, when powdered and mixed with 7 per cent. of B., has led to its adoption for that purpose in many cities; and in noiselessness, comparative cheapness, and dura-

bility it displays decided advantages over any other material. On account of its smoothness it is not well adapted for steep inclines, and the objection of slipperiness after slight rain has been raised against it.

In 1873 Great Britain imported 11,690 tons of A., the greater portion being furnished by the W. Indies and France.

Asphodel, the common name for the genus of plants *Asphodelus*, belonging to the order *Liliaceæ*. The species, which are not many, are perennial herbs with thick fleshy roots: they are natives of Southern Europe. The yellow A. (*A. luteus*); the white A., or king's spear (*A. albus*); and the branching A. (*A. ramosus*), are very ornamental garden plants. The last named, which is regarded as a variety of the white A., is very abundant in some parts of Italy, where it affords excellent food for sheep. The bog or Lancashire A. is the *Narthecium ossifragum*, a common British plant in wet moors, belonging to the order *Funcaceæ*. The name of Scotch A. is often given to *Tofieldia palustris*, a British plant belonging to the Colchicum family (*Melanthaceæ*).



Asphodelus ramosus.

Asphyx'ia is death beginning at the lungs. It is characterised by loss of consciousness and muscular power, stoppage of the movements of the chest, and afterwards of the pulsations of the heart, along with accumulation of blood in the right cavities of that organ, and throughout the venous system generally. It is caused by any interference with the passage of air to and from the lungs. When from any cause this occurs, the venous blood carried to the lungs by the pulmonary artery is not arterialed in the capillaries, and consequently is returned to the left side of the heart still in a venous condition. This venous blood is at once distributed by the left ventricle to the brain, nervous centres, muscular system, and to the heart itself—all of which organs require a proper supply of arterial blood for the due performance of their respective functions. This accounts for the confusion of ideas, delirium, unconsciousness, muscular spasms, convulsions, and failure of the heart's action. The blood quickly stagnates in the pulmonary capillaries, and the backward effects of the disturbed circulation ultimately distend the right side of the heart and venous system with very dark venous blood. The cause of the stagnation of the blood in the pulmonary capillaries is not well understood. After death, the left chambers of the heart contain only a small quantity of dark-coloured blood, and the vessels of the membrane and the sinuses of the brain are filled with dark blood.

A. may be caused in any of the following ways: (1) Breathing an irrespirable gas, which quickly causes spasm of the glottis, and thus prevents air from passing into the lungs; (2) mechanically, by pressure on the windpipe, as in strangulation; or by the impaction of a foreign body in the trachea, as in choking; (3) by puncture of both pleural cavities, which allows the air to press the lungs towards the back part of the cavity of the chest; (4) by pressure on the outer surface of the chest, so as to prevent the movements of inspiration, as in death caused by a squeeze in a crowd of people; or by sand or gravel so falling on a labourer as to surround his chest and leave the head free; (5) by paralysis of the respiratory nerve-centres in the medulla oblongata, as in hanging, where, as practised in this country, death is caused by the odontoid process of the axis (the second cervical vertebra) being fractured and crushed into the medulla; (6) by narcotic poisons, which paralyse the respiratory centres; (7) by immersion in water, or any other fluid which prevents air from passing into the lungs; and (8) by any mechanical impediment placed in front of the mouth. The general rules for treating an asphyxiated person are—(1) to remove the cause as quickly as possible; (2) to admit around him abundance of fresh air; and (3) to excite artificial respiration. For further details see DROWNING and RESPIRATION.

Aspidium, a genus of Ferns (q. v.).

Aspinwall, a town on the small island of Manzanilla, in the United States of Colombia, founded in 1852, and ceded in perpetuity to the Isthmus of Panama Railroad Company, is the terminus on the Atlantic side of this railway, which, connecting the Atlantic and Pacific, has been termed the *highway of the world*. Already seven great lines of mail steamers touch at A. Pop. about 4000.

Aspirate means a breathing (Lat. *spiro*, I breathe). The strong breathing (Lat. *spiritus asper*; Gr. *pneuma dasu*) corresponds to the letter *h*, and is formed by the free emission of breath through the perfectly open glottis. There is also a soft breathing (Lat. *spiritus lenis*; Gr. *pneuma pilon*), a slight sound heard on the pronunciation of any initial vowel, as in *old*. The mark of the rough breathing was originally *h*, afterwards *H*; finally the rough and soft breaths were expressed by the halves of this mark, thus *h* and *h̄*, whence came the present signs; and Max Müller denies, on physiological grounds, the identity of the *h* with the *spiritus asper*. The term *A.* is also applied to combinations of *h* with the letters called mutes or checks, from the fact that in their formation the emission of breath is quite checked. When *h* is breathed immediately after a check, sounds are produced occurring in Greek *kh*, *th*, *ph* (hard aspirates), and occurring in Sanskrit, *gh*, *dh*, *bh* (soft aspirates). Whether the original Aryan language possessed both hard and soft aspirates is a point much disputed among philologists.

Aspirator is an apparatus used in physics and chemistry to draw a continuous stream of air through tubes or other vessels.



Aspirator.

Canine teeth are developed in the males only. The dental formula shows six incisors, two canines, six præmolars, and six



Wild Ass.

Onager, a native of Central Asia, is the progenitor of the common *A.* and other domesticated varieties or breeds. In Persia, Tartary, &c., these animals occur in large herds, migrating towards India in winter. The 'Kiang Djiggetai' (*Equus* or *Asinus hemionus*) of Central Asia appears to be a second distinct species of wild *A.* It is coloured a pale grey or tawny, with a blackish dorsal line. This form neighs like a horse, and appears in certain points to resemble the domesticated *A.* more closely than the wild *A.* The domestic *A.* is used as a beast of burden in Arabia,

Persia, and Syria. The costermongers in London use it almost exclusively in their trade, and it is only right to say that it is well treated as a rule. Of late years Baroness Burdett Coutts and others have taken much interest in the *A.*, and have endeavoured to raise its status by offering liberal prizes in competitions at agricultural shows, but the effort has been a comparative failure. The *A.* in its nature is much harder than the horse, and subsists upon much coarser food. It can find meat when other beasts of burden would starve, as it is fond of thistles and other prickly plants. In Ireland, on small farm-holdings, it is often employed in ploughing and harrowing, and shows no obstinacy. Its milk contains less caseine and more saccharine matter than cow's milk, and it is used in cases of debility.

Assagay-Tree, the name at the Cape of Good Hope for *Curtisia jaginea*, a large tree belonging to the order *Cornaceae*. The natives in the districts where it abounds use its wood for shafts for the javelins, or *assagays*; hence its common name. The genus is named in honour of *Curtis*, a well-known English botanist.

Assai, the name of a beverage used by the inhabitants of Pará, which they manufacture from the ripe fruit of *Euterpe adulis*, a palm-tree which grows in swampy places, and attains a height of 30 or 40 feet. It is very nutritious when sweetened with sugar and mixed with farina, such as Manioc (q. v.). It forms the daily food of a large number of the inhabitants.

Assal, a salt lake in Adel, E. coast of Africa, near the mouth of the Red Sea, 25 miles S.W. of the seaport of Tajurrah. It is 8 miles long and 4 broad, lies 700 feet below the sea-level, and yields vast quantities of salt for the Abyssinian caravans.

Assam, since February 1874 a separate province of India, is a long curving valley watered by the Brahmaputra and other rivers, bounded on the N.E. by the mountains of Tibet, and separated also by mountains from Burmah on the S. and S.E. Area, 27,800 sq. miles; pop. according to census report (1873), 1,682,692; chief town, Gowhatti. Timber abounds, the reserves being under the management of the Forest Department, the open forests under civil officers. The tea-plant was introduced in 1826, and in 1874 the yield of tea was 11,082,958 lbs. For 1875 it is estimated at over 13,000,000 lbs. The teas from *A.* are especially valued on account of their strength, and are preferred to those of other districts for mixing pur. *ees*. Rice, the precious metals, lead, petroleum, and coal are other products. Wild animals, tigers, elephants, rhinoceroses, and buffaloes are very abundant. *A.* was ceded to the British at the close of the Burmese war (1826), but was not placed completely under British administration till 1838. *Annals of Ind. Admin.*, 1872-73, by Dr G. Smith (Seramp. 1874).

Assas'ains (Lat. *Assassini* and *Assisini*), the name given by the mediæval chroniclers to a branch of the Ismaelites (q. v.) of Persia and Syria, belonging to the Shiite sects. It is thought the name is a Latinised form of the Arabic *Hashashin* ('herb-eaters'), because they were wont to madden themselves with various intoxicating plants when about to proceed to their bloody work. Eastern writers, however, rarely use the name *Hashashin*; here and there we find *Fedkwi* ('the self-sacrificers'), but in general the *A.* are not distinguished from the larger sect of Ismaelites from which they sprung. Hassan-ben-Sabbah-el-Homairi, the founder of the *A.* proper, whose convictions of the truth of Islamism were not deep, was of Persian origin, had studied under Mowasek, at Nishpur, about the middle of the 11th c., and had been partially initiated into the mysteries of the Ismaelites. But having quarrelled with the heads of the Grand Lodge at Cairo, he was expelled, and escaping to Persia, proceeded to found an order of his own, which should exert an organised terrorism over the neighbouring districts. Seizing the Persian fortress of Alamut in 1090, he quickly acquired territory and influence by intimidation and assassination. The order so founded consisted of seven degrees. At the head of it was the Prince or Old Man of the Mountain (*Sheikh-al-Jebel*), who had lieutenants (*Dai-al-kbir*) in Jebel, Kuhistan, and Syria. Under these were the *Dair* and *Rofiks*, whose initiation was imperfect, and who were not accredited as teachers. The novices and mechanics rigidly observed the Koran, an obligation from which the initiated were relieved. So great was the dread inspired by the *Sheikh-al-Jebel*, that princes were wont to ensure their safety by secretly paying him tribute. Hassan died, aged

seventy, in 1124. In 1163 Hassan II. was slain by his brother-in-law for abolishing Islamism in the whole order, but it was re-established by Hassan III. The seventh and last *Sheikh-al-Yemen*, or chief of the Persian A., was Rohn-eddin, who was crushed in 1256 by the famous Mongol, Hulagu, and the Syrian branch was completely destroyed in 1272 by Bibar, the powerful Sultan of Egypt. See Von Hammer's *Geschichte der Assassinen* (Stutt. and Tüb. 1818); Sir John Malcolm's *History of Persia* (2d ed. Lond. 1828); and Weil, *Die Assassinen*, in Sybel's *Hist. Zeitschrift* (Jahrg. 1863).

Assault (Lat. *ad* and *salio*, to spring towards) is a sudden attack upon a fortified place. The attacking body is divided into 'storming-parties,' 'support-parties,' and 'firing-parties.' The storming-parties endeavour to force their way into the place, and are sometimes accompanied by 'ladder-parties' with ladders for scaling purposes. The firing-parties, or musketeers, serve to a certain extent to shield the storming-parties from the enemy's fire. The support-parties follow in the rear.

Assault, in law. See BEATING AND WOUNDING.

Assay, or **Assaying**, is the method by which the proportion of the precious metals present in any of their alloys is determined. Silver-plate must by law be made of a certain degree of fineness in Great Britain, and each article made has to be assayed, and, if approved, stamped at the Goldsmiths' Hall. Assays of gold jewellery are similarly made and guaranteed, and it is besides a matter of great commercial importance to test the degree of fineness of coin and bullion, &c. The principal method of estimating the alloys with the baser metals is by the cupel, or cupellation. The operation of cupellation depends on the ready oxidation of lead at high temperatures, and by the action of lead oxide, copper and other metals, added to gold and silver, are freely oxidised. The oxides so formed are, in a state of fusion, absorbed by the porous body of the cupel in which they are reduced, leaving the noble metals in the form of a round metallic globule on the surface of the cupel. A cupel is a form of crucible made out of pure bone-ash, and is highly porous in structure. A sufficient number of such cupels for the tests to be made are introduced into a muffle, or covered fireclay pot, placed in a furnace of special construction, and heated gradually to a bright redness. A minute quantity of the metallic compound to be assayed is carefully weighed, and wrapped up with a proportion of pure lead, varying according to the supposed degree of fineness. This is introduced by means of a pair of tongs into the heated cupel, in which it fuses, and the lead quickly forms films of oxide on the surface of the globule, which are absorbed by the cupel till, when the pure silver or gold is only left, the surface assumes a bright metallic lustre. It is then gradually and carefully cooled, and the weight of the globule left on the surface, compared with the weight of the original sample, gives the means of determining the degree of fineness of the alloy to within a small fraction of the absolute composition. In the A. of a gold alloy, a larger proportion of lead has to be employed than is required for silver, and bismuth may be substituted for lead in the process of cupellation. In cases where it is necessary to estimate separately the gold and silver in any alloy, the process of cupellation is only employed, if necessary, for first eliminating the base metals. The proportions of gold and silver are ascertained by the process of parting or quartation. The silver is dissolved out of the compound by the action of hot nitric or sulphuric acid, but as the gold will not part with the silver unless the latter be present in large quantity, as much pure silver is added to the A. sample as will make the weight of the silver three times that of the gold. When the two metals, in these proportions, are thoroughly incorporated, the globule is hammered out, and twisted into a small spiral, in which state it is termed the cornet. The cornet is submitted twice to the action of boiling nitric or sulphuric acid, which dissolves out the silver, and the weight of the gold is determined after it has been compacted by heating to redness in the muffle.

The humid process is a method of A. applicable only to silver alloys, and depends on the chemical reaction between a solution of chloride of sodium and nitrate of silver. The chlorine combines with the silver, forming an insoluble chloride of silver, and the nitric acid takes up the sodium to form nitrate of sodium, thus, $\text{AgNO}_3 + \text{NaCl} = \text{AgCl} + \text{NaNO}_3$. A solution in nitric acid of the alloy to be tested is prepared, to which a

standard solution of common salt is gradually added so long as a precipitate is formed. The quantity of the solution of salt required to precipitate the whole silver as chloride gives a basis for calculating the proportion of silver present in the alloy. The humid process produces much more accurate results than can be obtained by the cupel, and it is now used in most mints for estimating silver alloys.

A close approximation to the value of gold can be made by means of the streak produced on a touchstone or a piece of slate. The streak made by the article to be tested is compared with the streaks made by a number of pencils of gold of known composition. The streak may be tested in various ways, in addition to the ocular evidence it affords, and it is of value as a preliminary test when an estimation of the proportions of gold and silver is to be made, affording as it does an indication of the amount of silver which ought to be added for the process of quartation.

Assaye, a village in the fork of the Juah and Kaitna. Here Wellington, then Major-General Wellesley, gained a signal victory over the Mahrattas, 23d September 1803, which established British supremacy over a great part of India.

Asseerghur, a formidable mountain fortress in the N. E. of the presidency of Bombay, taken by the British in 1803, and again in 1819. There are only two approaches, both of them steep, and strongly fortified with escarpments nearly 100 feet high. The town stands at the foot of the rock on which the fort is built. Pop. about 2500.

Assema'ni, **Jos. Simon**, a celebrated Orientalist, born at Tripoli, in Syria, in 1687. He belonged to a Maronite family of Lebanon. In his travels through Egypt, Syria, &c., he collected numerous Oriental MSS. for the papal library, of which he was keeper. A. died 14th January 1768. His most important works are *Bibliotheca Orientalis Clementino-Vaticana* (4 vols. Rome, 1719-28), an edition of the *Opera Ephraemi Syri* (6 vols. Rome, 1732-46), *Kalendaria Ecclesie Universae* (6 vols. Rome, 1755-57), and *Bibliotheca Juris Orientalis Canonici et Civilis* (4 vols. Rome, 1762-64). His sister's son, **Stephan Evodius A.**, born at Tripoli, 1707, keeper of the Oriental MSS. in the Vatican Library from 1768, and Archbishop of Apamea, died 1782, is the author of three valuable works: *Bibliotheca Medico-Laurentina et Palatina Codices Manuscripti Orientales* (2 vols. Flor. 1742), *Acta Sanctorum Martyrum Orientalium et Occidentalium* (2 vols. Rome, 1748), and a fragmentary catalogue of the MSS. in the Vatican Library (Rome, 1757). A brother of Stephan, **Josephus Aloysius A.** (born 1710, died 1782), is the author of a *Codex Liturgicus Ecclesie Universalis* (13 vols. Rome, 1749-66), *De Catholicis seu Patriarchis Chaldaeorum Nestorianorum* (Rome, 1775), and other works. A later kinsman, **Simon A.** (born 1752, died 1821), is the author of several useful treatises: *The Museo Cusico Naniiano Illustrato* (2 vols. Pad. 1787-88), *Saggio sull' Origine degli Aravi* (Pad. 1787), *Catalogo dei Codici Manoscritti della Biblioteca Naniiana* (Pad. 1787), and *Globus Calesis Cusico-Arabicus* (Pad. 1790).

Assembly, General, the chief court of a Presbyterian Church. That of the Church of Scotland comprises both a lay and a clerical membership, and composed of representatives from each of the eighty-four presbyteries, of representatives from the four universities, and of elders from the royal burghs. It assembles annually at Edinburgh in May, is presided over by a moderator elected every year, has a principal and deputy clerk, a procurator, and an agent. In all matters ecclesiastical the G. A. possesses supreme legislative and judicial authority; but the civil power, on the other hand, possesses the right of determining whether a matter is ecclesiastical or not. The civil authority is represented by a royal commissioner. The constitution of the G. A. of the Free Church is the same, with the exception of the royal commissioner. The business not overtaken during the sitting of the G. A. is handed over to a commission which meets quarterly, and of which the moderator is convener.

Assembly, National, the name assumed by the Commons or *Tiers-etat* of the States-General, convoked by Louis XVI. of France, May 5, 1789. The clergy and nobles, from fear of their votes being outnumbered, having refused to sit in the same chamber with the Commons, the latter constituted themselves a N. A., and were afterwards joined by deputies of the two

privileged orders. They framed a new constitution, based on the sovereignty of the legislative body, subject to the veto of the king, whose person was declared inviolable. In little more than two years the Assembly passed 3250 decrees, by which feudal France was swept away. The chief of these measures were the suppression of monastic orders, the declaration of the Rights of Man, the introduction of free-trade, the confiscation of Church property, the issue of Assignats (q. v.), and the abolition of all aristocratic titles. In September 1791 the king accepted the new constitution, and the Assembly, called also from its functions the Constituent Assembly, then made way for the Legislative Assembly, intended to reform the civil and criminal laws in the spirit of the Revolution. Former members were formally excluded from the new Assembly, which, carried away by the excitement of the times, abolished monarchy, and imprisoned the royal family. A National Convention (q. v.) was summoned to license these infractions of the new constitution, to which all parties had so recently sworn allegiance.

There was a N. A. elected after the revolution of 1848, and another in February 1871, on the termination of the Franco-Prussian war. A N. A., professing to represent Germany, met at Frankfort in 1848, and the Cortes of Spain constituted itself a N. A. on the abdication of Amadeus I., 16th February 1873.

Assembly of Divines, or Westminster Assembly, appointed by an ordinance of the two Houses of Parliament, June 12, 1643, 'to confer concerning the liturgy, discipline, and government of the Church of England, or the vindicating the doctrine of the same from all false aspersions and misconstructions;' was composed of 149 members, of whom 119 were clergymen, 10 were from the Lords, and 20 from the Commons. To these were added 4 clerical and 2 lay commissioners from Scotland. The place of those who had died, or who refused to attend, was supplied by *superadded* members. From the first meeting, July 1, 1643, till February 22, 1649, the Assembly sat 1163 times. Almost complete unanimity existed as to doctrine, but there was great divergence respecting Church government. After some opposition, the *Solemn League and Covenant* was sanctioned, and Parliament ratified the *Directory of Public Worship*, October 2, 1644, and the doctrinal part of the *Confession of Faith*, March 1648. The *Shorter Catechism* and the *Larger Catechism* date respectively from November 5, 1647, and September 15, 1648. The theology of these formularies, which are the standards of all Presbyterian Churches, is Calvinism, and the mode of Church government sanctioned is the Presbyterian. Hitherto Baillie's *Letters* and Lightfoot's *Journal* have been the chief authorities for the details of the proceedings of this Assembly; but in 1874 William Blackwood & Sons, Edinburgh and London, published the *Minutes of the Sessions of the Westminster Assembly of Divines, while engaged in preparing their Directory for Church Government, Confession of Faith, and Catechisms, 1644-49*. Edited by Rev. Alexander F. Mitchell, D.D., and Rev. John Struthers, LL.D. A list of the members is given in Masson's *Life of Milton*, 1871, pp. 509-527.

Ass'er, John, the biographer of Alfred, was a monk of St Davids, in Wales, and most probably of Welsh origin, for he speaks of the English as if they were a people foreign to him, calls Wales his 'own country,' and states that he was 'bred and educated there.' Alfred invited him, about 885, to the court of Wessex on account of his skill in literature; and he certainly exercised a direct influence over the king's studies, for he expressly tells us that during an eight months' visit to Alfred (before finally settling in Wessex) he 'read to him whatever books he liked.' Alfred was greatly attached to his learned and pious friend, bestowed on him many gifts, and finally made him Bishop of Sherburne. The *Chronicle* gives the year 910 as the date of his death. A. will always be remembered by his *Annales Rerum Gestarum Alfridi Magni*, an historical memoir which embraces the greater part of Alfred's life. As a contemporary record of the noblest of English princes, it possesses the highest value. It was first published, but in a very corrupt form, by Archbishop Parker, in 1574. The best edition is that of Wise (Oxf. 1722). It gives the text of the 10th c., and is accepted by most scholars, English and German, as in the main the work of A. The question is critically discussed in Dr Reinhold Pauli's *Alfred the Great* (Bohn, Lond. 1857).

Asses, Feast of. See FOOLS, FEAST OF.

Assessed Taxes. These include various domestic taxes assessed on houses, menial servants, carriages, and other private articles. In 1851 duties on windows were abolished, and instead a duty was put on inhabited houses worth £20 a year or upwards of rent. The inhabited house duty is, for dwelling-houses, 9d. per £; for shops, and some other classes of houses, 6d. per £.

Assessors are persons appointed to advise and assist a judge as to procedure, and in forming his judgment. They are usually barristers; in Scotland, advocates. In ecclesiastical law procedure, functionaries of the Church are usually joined to a barrister of good standing.

Assets, derived from the old French *assets*, enough, originally meant the property of one deceased equivalent to his debts. It is now, however, generally used in contradistinction to the word 'liabilities,' in mercantile affairs; hence its meaning is apparent. In a mercantile Balance-Sheet (q. v.) the A. are placed on one side, the liabilities on the other. If the former exceed the latter, the concern is solvent; otherwise, it is insolvent. In English law, A. are *legal* or *equitable* according to the nature of a procedure which a creditor may use against the executor or heir. A. is not a technical term in the law of Scotland; but it is much used in mercantile affairs, in which it has the same signification as in England.

Assidians. See CHASIDIM.

Assignation is a legal term in Scotch law analogous to the English term Assignment (q. v.). It is applied to a written deed of conveyance in favour of another, made by the creditor in any obligation, or by the proprietor of any subject not properly feudal. The maker of the A. is called the *cedent*. The receiver is called the *assignee*, or *cessioner*, or *cessionary*; and where the right or subject assigned is a debt or obligation, the obligant or debtor in this is called the *common debtor*. To complete the transference to the assignee, the A. must be intimated to the common debtor; and if there is more than one A. of the same subject or debt, the first intimated is preferable, though another be of prior date. The intimation ought to be notarial; but it may be made effectively by other formal notice. Some assignments, however, require no intimation. Indorsation of a Bill of Exchange (q. v.) and Adjudication (q. v.) require none. In Scotland, A. of movables, while the cedent retains possession of them, is not effectual against an onerous creditor.

Assignats. This was the name of a paper issue, under the authority of the French National Assembly, after the revolution of 1789. The notes were for the values of from five to a hundred francs. They were nominally on the security of land held to be assigned to the holder. The first issue alone bore interest. The law, so far as it could, made the acceptance of the A. at full nominal value compulsory. But the law of political economy proved stronger than that of the National Assembly, and in March 1796 twenty-four francs in gold were worth 7200 in A. In July of the same year the forced currency was withdrawn, after doing a great deal of mischief to the public.

Assignee in Bankruptcy. See BANKRUPTCY.

Assignment, in English law, is a deed or instrument of transfer; the operative words of which are to 'assign, transfer, and set over' to another, some right, title, or interest in real or personal property. A possibility, right of entry, or matter in an action or suit, cannot be assigned; nor can arrears of rent, and matters similar. Some things are assignable by custom and under statute which would not be so by the natural operation of English law. Thus promissory notes and bills of exchange (see BILL OF EXCHANGE) are so. An A. for the benefit of creditors is generally of the whole of the debtor's property; which A. the creditors accept in place of their claims. Unless, however, all creditors assent, such an A. may be a fraud under the Bankrupt Act of 1869. By it a fraudulent A. is an Act of Bankruptcy (q. v.). An A. with intent to defraud is void. This word is also sometimes used in the law of Scotland to denote the transference of property in patents, copyrights, and registered ships.

Assignment of Error, in English law, is the statement of grounds on which alteration of the judgment of a court of law is asked from a higher tribunal. Under the Common Law Pro-

cedure Act the term is now limited to certain grounds of objection there defined.

Assigns, in the law of England, is the term applied to parties in whose favour an Assignment (q. v.) is made. The analogous Scotch term is Assignee. See ASSIGNATION.

Assimilation. See NUTRITION.

Assiniboine, a river in the S. of the Dominion of Canada, Hudson Bay Territories, flowing W., and joining the Red River at Fort Garry.

Assisi, an episcopal town of Central Italy, in the province of Perugia, with manufactures of needles and files, and famous as the birthplace of St Francis, founder of the Franciscan order of Mendicants, who built here the Convento Sacro, a beautiful specimen of early Gothic, containing many exquisite paintings by Cimabue and Giotto. The tomb of the saint is said to have been sometimes visited by as many as 100,000 pilgrims in one day. The poet Metastasio was also a native of A. Pop. 14,033. Some remains of the ancient Umbrian town *Assisium* exist, including a portico of the temple of Minerva, with fluted Corinthian columns, the whole constructed of travertino.

Assize. The word, according to Sir Edward Coke, is derived from the Latin *assideo*, to sit together. In England, assizes are held twice, or, in some counties, three times a year, except in Middlesex, before two judges appointed by the Queen's special commission. These judges sit in virtue of five several commissions—namely, of commissions of the peace, of *oyer and terminer*, of gaol delivery, of A., and of *nisi prius*.* A. also signifies any statute or ordinance for regulating the weight, measure, or quality of the thing which it concerns, as formerly the A. of 'w' or ale.

In Scotland, A. sometimes signifies the sittings of a court, sometimes its chances, and sometimes the jury. A jury or A. in the Court of Justiciary consists of fifteen men, formerly chosen by the court, now chosen by ballot from a greater number (not exceeding forty-five), summoned by the sheriff; of these a list must be served on the defender, with a copy of his indictment.

Associate Synod was the designation adopted by that party among the Seceders (see UNITED PRESBYTERIAN CHURCH) who affirmed that it was lawful to take the burgess oath, and who were therefore popularly known as 'Burghers.' As the other party, the Antiburghers, denied this, a 'split' became necessary, and accordingly it took place in 1747. The Antiburgher Synod called itself the *General Associate Synod*.

Association. See CO-OPERATION SOCIETIES, LEAGUE, COMPANY.

Association of Ideas is a general name for the orderly sequence which obtains among mental states. Aristotle says, 'Each mental movement is determined to arise as the sequel of a certain other.' He then states that reminiscence, whether voluntary or spontaneous, proceeds according to the law of similars, the law of contraries, and the law of coadjacents (including order in space and in time). Hume says, 'To me there appear to be only three principles of connection among ideas: resemblance, contiguity in time or place, cause and effect.' Hamilton and others have pointed out that 'cause and effect' is merely a case of contiguity in time—viz., succession. The association of contrary ideas is also generally admitted to be due to often-repeated contiguity, assisted by the mental shock of contrast: in the connection of relatives proper, e.g., son and father, the one idea may be said to be a part of the other. James Mill attempted to reduce the connection of similar ideas to the law of contiguity, on the ground that we generally see like things together. On this view, which is affirmed on a large scale by evolutionists, mental association would depend entirely on the order in which the original sensations presented themselves. Similarity is, however, admitted by psychologists to be an independent source of attraction among ideas. Vivid impression, frequent repetition, and retentiveness of the particular mind affected are the main conditions of strong association. Mr Bain thus states the law of contiguity: 'Actions, sensations, and states of feeling, occurring together, or in close succession, tend to grow together, or cohere

in such a way that when any one of them is afterwards presented to the mind, the others are apt to be brought up in idea.' A good example is in the association of the feelings of vocal effort which so largely assists pure memory. The idea of a nauseous taste calls up the feeling to a certain extent. Mr Bain states the law of similarity thus: 'Present actions, sensations, thoughts, or emotions, tend to revive their like among previous impressions.' This property of mind is at the root of the scientific faculties which trace identity in the midst of diverse conditions. Although the laws of A. of I. have long been known, it was only by degrees that they were applied in explanation of particular mental operations or faculties. Thus Locke notices A. of I. in a short chapter dealing chiefly with the prejudices of children; while Bain abandons the subdivision of the mind into faculties, and proceeds entirely on the laws of A. of I. The controversy as to the origin of knowledge has consisted chiefly in attempts to explain by A. of I. indissoluble or 'necessary' connections of ideas. Aristotle confined himself to habitual connection, not thinking that a necessary connection required explanation. Berkeley, however, has successfully applied A. of I. to the perception of distance; and some psychologists even maintain that the belief in an external world is due to the association of possible sensations with movements. Physiologists assert that when impressions are received together or in succession, a connection along a definite tract of nervous force is established. Nothing is known, however, with regard to the actual changes taking place in the substance of the brain.

Assouan, **Esuan**, or **Eswan**, the Syene of the Greeks, who formed the word from the Coptic (A., *souan*, the opening, to which the Arabs have added their article *el*, softened into *es*), a town in Upper Egypt, on the right bank of the Nile, near the last cataracts, best known for its quarries of a kind of granite, called, from Syene, syenite. In these quarries there are still remains of partially-cut blocks, and numerous inscriptions, which served to indicate what material had been quarried and removed, and by the order of what king. The staple trade is in dates, the palm flourishing well here. The traffic in slaves has not yet been suppressed, and there is no other trade of importance. Pop. 4000.

Assumption of the Virgin Mary, a festival of the Greek and Roman Churches, held on the 15th of August since the 7th c., in commemoration of the assumption of the soul and body of the Virgin into glory by Christ and his angels. From the 4th c. to the 7th the same day was observed in memory of her death.

Assurance. See INSURANCE.

Assurance, Common, is the legal evidence of the conveyance of property. See CONVEYANCE, DEED.

Assyria was a part of the Mesopotamian plain nearly as large as Great Britain, bounded on the N. by Mount Niphates in Armenia, on the W. by the Khabur and the Euphrates, on the S. by the alluvial plain which forms the N. of Babylonia and Susiana, and on the E. by Media, from which it is separated by Mount Zagros (mod. Mountains of Kurdistan). E. of the Tigris A. consists of fertile plains in the lateral valleys; W. of the Tigris it consists of an undulating tract and a level plain, both sterile and with little water, lying N. and S. of the Sinjar Hills. Eastern A. is the scene of its history, the warlike expeditions to the W. being always described as 'across the Tigris.' Adiabene, the most fertile district, watered by the two Zab rivers, was near the sites of the capital cities Asshur, Nineveh, and Calah. Ruins of cities and strongholds are frequent on the E. bank of the Tigris. About the origin of A. nothing is certainly known; but the traditions of Nimrod, the Biblical statement that Nineveh was founded by Asshur from Babylon, and the similarity of Assyrian race and civilisation to the older Babylon, suggest that A. was colonised from Lower Mesopotamia, which is supposed to have been the source of Semitic emigration to Arabia and Palestine. The original capital of A. was Asshur (now Kalah Sherghat), on the W. bank of the Tigris, 60 miles S. of Nineveh. Till lately the Kalah Sherghat cylinder was the earliest historical document: it gave the names of five kings, going back to the 13th c. B.C. We have now a tablet giving the names of four kings in the 14th c., and the list of kings is hypothetically completed to 1850 B.C. Asshur is said to have existed in that century, but it may have been partly dependent on Babylon. Twenty-one kings, commencing

* There are eight circuits annually—the Home, the Midland, the Norfolk, the Oxford, the Northern, the Western, the N. Wales, and the S. Wales.

with Ismidagan, and including two of the name of Samsivul, must have reigned at Asshur. Of these, Belnirari (1370-50) and Vulnirari I. (1330-1300) both defeated the Babylonian Kassi. From 1300 to 745 (when the Canon of Ptolemy introduces certainty into dates) we have twenty-two kings, ending with Assurnirari II. Shalmaneser I. (1300-1271) built the city of Calah, 40 miles N. from Asshur. It is now represented by the mounds of Nimrud, near Nineveh. Shalmaneser made Nineveh the seat of government. His son, Tigulti-ninip, or Tiglath-nin (1271-1240), drove the Arabian kings from Babylon, and established there an Assyrian dynasty for seventy years. Assur-risilim (1150-1120) warred with Nebuchadnezzar I. of Babylon. His successor, Tiglath-Pileser I., whose history was written on the duplicate cylinders in the British Museum, simultaneously translated by four English scholars in 1857, subdued the Syrians, Moschians, and others, took tribute from the Armenians, Shuhites, &c., and stormed Babylon. He also restored the temples at Asshur, and built the Zab canal, and a palace at Calah. Assur-n'zir-pal (885) is mentioned among others as repairing and rebuilding the Nineveh temple of Ishtar, daughter of the god Hea. Shalmaneser II. (860-825) defeated Benhadad and Hazael of Damascus, received tribute from Jehu of Israel, and extended the Assyrian power from the Persian Gulf to the Mediterranean—'the seas of the rising and the setting sun.' The black marble obelisk in the British Museum shows his victories. In this reign the Ninevites, complaining of power being transferred to Calah, revolted in favour of Assur-dani-pal, but were suppressed by Samsivul IV. (Shamas Iva). In 810 Vulnirari III., the husband of the famous Semiramis, succeeded. Pul, mentioned in 2 Kings xv., was probably an officer of Tiglath-Pileser II. (745-727), who called himself King of Babylon. He defeated Rezon of Syria and Pekah of Samaria, besieged Damascus, and received tribute from Media, Chaldaea, Arabia, Moab, Gaza, and Tyre. He comes into contact with Azaiah and Ahaz of Judah, and Menahem and Hoshea of Israel. In 722 Sargon appears, of whose expedition against Ashdod, called 'my ninth expedition to the land beside the great sea,' Mr G. Smith has recovered an account on an octagonal cylinder. In spite of the combination of Judah, Edom, Moab, and Philistia, Sargon defeated the Egyptian Shebek (Sabago), reduced Samaria and Arabia Petraea, crushed Merodach Baladan at Baladan, and received tribute from Cyprus. He used widely the policy of deportation. His palace at Khorsabad is said to have been capable of holding 80,000 persons. His son Sennacherib (705-681), whose history in the Bellino and Taylor cylinders has been supplemented by Mr Smith, overran Phoenicia, smote Egypt at Alitaku, took Ekron, and after besieging Hezekiah in Jerusalem, carried off 200,000 Jews, and exacted a heavy tribute and indemnity, part of which was stripped from the temple. The destruction of Sennacherib's army at Pelusium by the 'angel of the Lord' (2 Kings xix.) is not referred to in the Assyrian inscriptions. Sennacherib also defeated at Khaluli a combination of Susub of Babylon and the Elamites. He built the great Nineveh Palace. His son Esarhaddon (681-668) resided sometimes at Babylon, the Babylonian contract-tablets of the period being dated by reference to his reign. His ten expeditions penetrated further than any of his ancestors. Cilicia, Tyre, Edom, Arabia, were all visited: he crushed Tirhakah of Egypt, and established Neco at Memphis. He pardoned Manasseh of Judah, but secured his power by augmenting the foreign population in Palestine. Twenty-two kings contributed materials to his palace at Calah, which is fully described in the inscriptions: he also built thirty-six temples, 'beautiful as the day.' Assur-bani-pal, or Sardanapalus (668-626), was the greatest of Assyrian kings, 'the principal patron of Assyrian literature,' the greater part of the library at Nineveh being written during his reign. He succeeded in two campaigns against Tirhakah and Undamane of Egypt, established Assyrian power at Sais, Memphis, and Thebes, and carried on an exterminating war in Susiana, where he took twenty-six cities, including Susa. His brother, Saulmugina of Babylon, frequently revolted, in league with Vaitch of Arabia. His palace at Kouyunjik is remarkable for the number of hunting-scenes it contains. Cruelty in war and magnificence at home are traceable in all the inscriptions of this reign. Little is known of the reigns of Bel-zakir-ishun and Assur-ebil-ili (Saracus), from 627 to 607, except that Phraortes the Mede attacked A., that there was a Scythian invasion, and that finally Nineveh was burned and the Assyrian empire destroyed by a league between the Babylonians under

Nabopolassar, and Cyaxares of Media. A. then becomes a satrapy of the Persian empire, which was overthrown by Alexander the Great, B.C. 312. His general, Seleucus, founded the dynasty of the Seleucids, whose capital was on the Tigris, below Bagdad. In 248 B.C. (a date fixed by Mr Smith from Babylonian tablets) Arsaces founded the Parthian dynasty of Arsacids, which again was destroyed (A.D. 226 or 237) by Artaxerxes, a tributary king of Persia. The Persians were succeeded by the Califs of Bagdad. Finally, in 1638, the Turks obtained A. Under their rule A. is scantily populated, in great measure by Arab tribes, and there is little cultivation of the soil. Nineveh has long been in ruins. It is last mentioned (A.D. 116) as having been captured by Trajan in an expedition against the Parthians. The modern Mosul, in the pashalic of Bagdad, has a good trade with Aleppo.

Religion.—'My Lord Asshur,' corresponding to the Babylonian Il or Ra, and represented by a winged circle enclosing the figure of an archer, was the supreme deity of A.; he is generally first mentioned in the inscriptions. Then comes a governing triad, Anu, Bel (whose wife was Beltis or Mylitta, 'mother of the gods'), and Hea; Sin, Shamas, and Vul 'in his stormy coil,' form a triad of the elements. 'My Lady Ishtar,' of Nineveh and Arbela, resembles Venus or Astarte. The Babylonian legend represents her as in love with Izdubar. 'Ninip fierce, the great warrior with his mighty arrows,' or Nin, represented by the winged bull, and Nergal, the winged lion, were also popular. Nebo and Nushu ('the glorious attendant') were inferior divinities. Each god had a goddess.

Discoveries, &c.—In 1842, M. Botta, French consul at Mosul, began work at Kouyunjik, a large mound opposite Mosul, and in the northern part of the site of Nineveh. He soon went to Khorsabad (Dursargina), some miles to the N.E., where he discovered Sargon's palace, and obtained many sculptures of mythological figures, battle scenes, processions, most of which in 1846 were deposited in the Louvre. The work, continued by M. Place (French consul), was taken up in 1845 by Mr Layard, who discovered the palace of Sennacherib at Kouyunjik, and one of the Nineveh gates, the palace of Esarhaddon at Nebbi-Yunas, a mound to the S. of Kouyunjik, and several palaces and temples at Nimrud (Calah). Since then Sir Henry Rawlinson and Mr Loftus have carried on important excavations; and in 1877 Mr George Smith, of the British Museum, made valuable additions to our knowledge. Grotefend was the first decipherer of the cuneiform (arrow-shaped) writing, but Sir H. Rawlinson, by the light derived from his interpretation of the trilingual Behistun inscription (genealogy and life of Darius), was first able to translate, in 1851, some official Assyrian documents. Dr Hinch and Mr Fox Talbot are among the best cuneiform scholars in England. Of the results of Mr Smith's expedition, the most important has been the completion of the tablets containing the Izdubar or Flood Legends, or Chaldaean story of the deluge, supposed to have been composed during the early Babylonian empire, about 2000 B.C. Izdubar, or Nimrod (who ruled in Erech, modern Warha, on the Euphrates), hears the story told by Ihasisadra (Xisithrus), who built the Chaldaean ark at Surippah. The deluge was caused by man's wickedness, but, unlike Noah's, it lasted only seven days, and many more than eight people escaped in the ark, which stranded, not on Ararat, but on a mountain to the E. of Adiabene. Ihasisadra was translated to heaven. Mr Smith has also found the Babylonian legend of the seven evil spirits, which illustrates the Assyrian pantheon. Anu rules, passive and supreme, in the upper heaven; his son, Vul, in the atmosphere; on earth, Bel, the active god of the middle region; in ocean, or the deep below the earth, Hea, who represents the mind or wisdom of God. 'There is chaos in heaven, and Bel wishes to create order by placing there Shamas (the sun), Sin (the moon), and Ishtar (Venus). This change the evil spirits resist, but are ultimately vanquished, though Shamas, Ishtar, and Vul take their side. Mr Smith observes that the Assyrian year consisted of twelve lunar months, to which they occasionally added an intercalary month, according to the relative positions of the moon and a certain star, 'the star of stars,' which was just in advance of the sun at the vernal equinox. He also gives interesting copies of Assyrian deeds of sale, with the designations and sales of the parties, the extent and boundaries of the subject (in one case 15 lbs. of silver for 500 acres), and the names of seven witnesses. The excavations show that the Assyrians were a luxurious, but a brave and ener-

getic people, fond of war and hunting. Enriched with costly tribute, and with the help of imported labour, they excelled in magnificent architecture, their sculpture being much superior in design and execution to that of the Egyptians. Their public drains and aqueducts show their knowledge of the arch; and from the Scriptures we see that the lever and the roller were used in building operations. Like the Babylonians, they made constant observations of the stars: a valuable astrolabe was discovered by Mr Smith in Sennacherib's palace. The link between A. and the subject states was payment of tribute; service in the field was not required, and very seldom were the Assyrian gods forced on the conquered. The agreements to pay tribute were more frequently broken as the empire extended; hence the exhaustion and sudden fall of A. See Rawlinson's *Five Great Monarchies of the Ancient World* (4 vols. 1862-67), and George Smith's *Ancient History from the Monuments—A.* (1875).

As'tacus. See CRAYFISH, LOBSTER.

Astar'te (the Ashtaroth, or, more correctly, the Ashtoreth, of the Old Testament), the chief goddess of the Phœnicians and Syrians, and erroneously confounded with the Greek Aphrodite. See ASHERA. Tyre and Sidon were the chief seats of her worship. Originally typified by a cow, her later emblem was a star, which is said to be the signification of the word Ashtoreth. There is little doubt that she was the moon-goddess, and more like Diana than Aphrodite.

Aster, a genus of Composite plants embracing about 200 species. They are mostly perennials and herbaceous, and a few are shrubby. They are found sparingly in Europe, Asia, and S. America, but abound in N. America. They generally flower late in the season, hence they are called Michaelmas daisies. There is only one species native in Britain, the *A. Tripolium*, which grows in salt marshes. There are many N. American species cultivated in gardens, the more showy kinds being *A. spectabilis*, *A. Nova-Anglia*, *A. versicolor*, and *A. turbinellus*. *A. Sikkimensis* from the Himalaya, and *A. anellus* from the S. of Europe, are also cultivated. The China A. of gardens is the *Callistephus Chinensis*, a very showy annual, of which there are numerous varieties.

Asterisk (Gr. *asteriskos*, a little star) was a mark (*) anciently used by grammarians in opposition to the obelisk, dagger, or cross, to denote that a passage was either unjustly suspected or not being genuine, or was otherwise notable. The Church fathers, however, introduced a certain laxity in the application of these signs. Thus Jerome, in his translation of the Bible, employed the A. to point out where the Greek version of *Theodotion* had more words than the Hebrew text. Since the invention of printing, the A. has served as a reference to a note at the bottom or on the margin of a page (though the letters of the alphabet and numerals are now much in use for this purpose), and also to mark omissions of one or more letters or words. A number of asterisks indicates that there is a gap in the text.

Asteroidæa, an order of the class *Echinodermata*, including the Starfishes (q. v.), which possess a central body or disc, giving origin to a greater or less number of arms or rays, containing prolongations of the organs and viscera of the body. The skin is calcareous or horny. The mouth, situated on the inferior aspect of the body, is unprovided with a dental apparatus. The tube-feet or *ambulacra* exist in grooves in the under-surface of the rays. The larva or young form is worm-like, and does not possess any calcareous skeleton.

Asteroid Polypes, a term applied to the Alcyonarian Polypes (see ALCYONIUM), in allusion to the star-like appearance presented by the tentacles or feelers around the mouth of each polype.

Asteroids, less commonly, but more correctly, called planetoids, the name given to a zone of small planetary bodies revolving in orbits situated between those of Mars and Jupiter. The first was not detected till the beginning of the present century, but the singular gap which, according to Bode's Law (q. v.), seemed to exist between the orbits of Mars and Jupiter, had suggested previously to astronomers the probability of there being one or more planets in that region hitherto unobserved, on account either of their small size or feebly luminous power. On the 1st day of January 1801, Piazzi of Palermo discovered a small planet, which he named Ceres; and within three years three more, Pallas, Juno,

and Vesta, were discovered by Olbers and Harding. For nearly forty years no more were noticed, though astronomers generally accepted Olbers' theory that the A. were fragments of some large planet, and that, probably, other such fragments would yet be discovered. Hencke's detection of *Astrea* in 1845, and the rapid succession of discoveries that followed, were hailed as a corroboration of this theory by its supporters; but it has since been shown upon dynamical principles, that the diversities existing between the elements of the individual orbits are inexplicable on the disruptive theory alone. The magnitudes of these planets are very small, the largest not exceeding 450 miles, while the majority are considerably smaller. The orbits are more eccentric than those of the larger planets, that of Nysa having an eccentricity amounting to almost one-half of the major axis. The inclinations to the plane of the ecliptic vary much—from only 41' 7" in the case of *Massalia*, to 34° 42' 41" in the case of *Pallas*. *Feronia* has the shortest year (1148 days), and *Sylvia* the longest (2374 days). From 1847 one or more have been discovered yearly, and in 1868 there were no less than twelve added to the list. At present (1875) there are 148, of which 137 have had their elements determined. The mean breadth of the zone in which they all lie is almost as great as the distance of the earth from the sun; but owing to the great eccentricity of several of the orbits, some of them venture much farther into space. Another interesting feature of these orbits, first pointed out by Mr Cooper, of Markree Castle, is that more than 70 per cent. have their perihelia within the semicircle from 0° to 180°. There must be some hidden cause for this speciality, for the laws of probability are utterly opposed to the casualty of such a distribution. As regards the mass of these small bodies, Leverrier has shown that their total mass cannot exceed one-fourth that of the earth; for if it did, the perihelion of Mars would have been disturbed within a century to a quite perceptible degree. In conclusion, it remains to be said, that notwithstanding the eccentricities and inclinations of these orbits, and the intricate net-like appearance which they, taken as a whole, present, yet even these minute orbs rigorously obey Kepler's three laws, thus affording a further proof, if such were necessary, of the truth of the Newtonian theory of the universe.

Asterophyllites ('star-leaved'), a generic name in palæontological botany, including certain fossil plants found in the Carboniferous rocks. The different forms of A. have recently been proved to belong to the foliage of the genus *Calamites*, the fossil stems of which they are generally associated with. The plants are allied to the horse-tails or *Equiseta* of the present day.

Asthe'nia. Life is maintained by the circulation of warm arterial blood. If no blood circulates through the arteries, or if the blood be entirely venous, that is, containing a deficiency of oxygen, death is the result. When no blood circulates, death is said to occur by Syncope (q. v.). This is of two kinds. First, there may be no blood to circulate, as in cases of profuse hæmorrhage: this is death by anæmia, or want of blood. Or the contractile action of the heart may fail: this is death by A. A. may be caused by disease of the heart, or by the action of various poisons; or it may be brought on by lightning, concussion of the brain, or intense mental emotion. A. is therefore a mode of death.

As'thma is a nervous disease, attended by great difficulty in breathing, hence the origin of the name, 'gasping for breath.' It is caused by spasm of the circular muscular fibres which surround the smaller bronchial tubes, which so contracts their lumen as to admit only a small quantity of air into the air-cells. A fit or paroxysm of A. frequently occurs during the night. The sufferer awakes with a sensation of suffocation, which sometimes is so severe as to cause him to sit up at an open window, and with livid countenance and outstretched arms to struggle in vain attempts to obtain relief. The expression is anxious, the eyes staring, the skin cold and clammy, or bathed with a hot sweat, the pulse small and weak. Gradually the symptoms abate, and there may be an intermission for hours, days, or even weeks. The irritation which excites spasm of the bronchial tubes (see REFLEX ACTIONS) may be central, in the *medulla oblongata* (the great respiratory centre), or it may commence in the peripheral branches of the pulmonary or gastric portions of the pneumogastric nerves. Dust, cold winds, irritant vapours,

ipécachuan powder, smoke, improper food, intestinal irritation, may be the proximate cause or causes of an attack. A. is not a fatal disease in itself, but it is apt to produce congestion of the lungs, emphysema, hypertrophy, with dilatation of the right side of the heart, and repeated attacks render the patient's existence miserable. The treatment may be divided into two parts—(1) during the attack, and (2) during the interval. During the attack, remove the cause, admit fresh air, and, in many cases, give an emetic to relieve the stomach. Attention must then be directed to remove the spasm by the use of nitrous ether, spirit of chloroform, breathing the fumes of burning filtering or blotting paper which has been soaked in a saturated solution of nitrate of potash and dried, or by the inhalation of chloroform. Smoking tobacco often gives great relief, while tincture of *Lobelia inflata* and tincture of *Stramonium* are also useful. Between the attacks everything must be done to improve the general health by the use of tonics, and the patient must live on light, easily-digested, nutritious food. Residence in a climate of equal temperature, not too moist, is also to be recommended.

As'ti, a large city of Piedmont, N. Italy, in the province of Alessandria, on the river Tanaro, 27 miles E.S.E. of Turin, on the Turin and Genoa Railway, the *Asta Pompeia* of the Romans, so called because it was rebuilt by Pompey the Great after it had been destroyed by the Gauls. It is the seat of a bishop, and carries on a considerable trade in silks, stuffs, and a celebrated wine like champagne, called *vino d'A.*, produced in the district. Pop. (1872) 31,033. A., which is a very ancient city, was burned by the Emperor Frederick Barbarossa in 1154. It was in the possession of France from 1387 to 1529, when it was ceded to Charles V. at the peace of Cambray, who gave it to his aunt, Beatrice of Savoy. Alfieri the poet was born at A., where a monument was erected to him in 1862.

Astigmatism is that condition of the eye in which the refractive powers of the horizontal and vertical meridians are unequal. It is due to the degree of convexity of these meridians being different, so that corresponding rays, instead of converging into one point, meet at two foci. The consequence is, the individual does not see objects in the same plane, although they may really be so. The defect may be corrected by the use of cylindrical glasses. See EYE.

A'ston, Luise, a German authoress, born about 1820. After separating from her first husband (an Englishman), she appeared as a champion of 'woman's rights,' displaying herself in male attire, and, by her conduct, was twice obliged to leave Berlin. During the Danish war, however, she showed great devotion as a nurse. She married Dr Meier of Bremen in 1851. Among her works is one entitled *Meine Emancipation, Verweisung, und Rechtfertigung* ('My Emancipation, Exile, and Vindication,' 1846).

As'tor, John Jacob, born in Walldorf, Heidelberg, Germany, July 17, 1763, was the son of a peasant. He came to London at sixteen, and emigrated to America in 1783. There he engaged largely in the fur trade, founding Astoria (q. v.), in the state of Oregon, as a dépôt. After the war of 1812 his mercantile enterprises were extended to all parts of the world, and he amassed the largest fortune in America (£4,000,000). By a gift of £80,000 he founded the A. library in New York, one of the largest and best for reference in the United States. A. died March 29, 1848. The A. property, mostly in New York, is still managed by the son, William B. A., and is valued at £12,000,000.

Astor'sa, Emanuele d', an eminent musical composer, born at Palermo in 1681. His father, a Sicilian nobleman, was executed by the Spaniards in 1701, during a war for the annexation of the island. Educated through the kindness of a Spanish princess at Astorga, in Leon (whence his name), he displayed a great talent for music, and became a great favourite at the court of the Emperor Leopold of Austria, after whose death he travelled through the greater part of Europe, staying in London two years. The original score of his best composition, the *Stabat Mater*, still much admired, is still preserved at Oxford. A. died about 1755.

Asto'ria, a village and port of entry in Oregon, U.S., 10 miles from the mouth of the Columbia river, formerly a dépôt

for the American fur trade. It was founded in 1811 by Astor (q. v.), and is notable as a chief point on which the American claim to the Oregon Territory (q. v.) was based.

Astrabad', a town in the province of the same name, Persia, at the N. base of a high and densely-wooded spur of the Elbruz Mountains, 20 miles from the S. shore of the Caspian. It was formerly the capital of the Kajar princes, from whom the present sovereign family of Persia is descended, and is still surrounded by mud walls. The number of half-ruined buildings, among which the remains of the splendid castle of Shah Abbas are conspicuous, give a somewhat waste appearance to the town, but this effect is modified by its large bazaar, its numerous mosques, and its gardens rich in fig, pomegranate, orange, and citron trees. The trade is hampered by the insecurity of property, for the Turkoman tribes approach, and sometimes break through its walls. But since the Russians of late years have established a consulate here, and obtained possession of the island of Ashur-adeh (Great Ashur), not far off, its prosperity has begun to revive, and will probably increase. Unfortunately it is so unhealthy as to be called by the Persians 'the city of the plague.' Pop. 6000 to 8000.

Astræa, daughter of Zeus and Themis, was the goddess of justice, hence also called *Dike*, and was the last divinity to leave the earth on the expiry of the Golden Age. She took her place among the stars as *Virgo*.—A. is also the name given to the planetoid discovered by Hencke, December 8, 1845. Its sidereal revolution is 1511 days.

Astræa. See CORAL and MADREPORE.

Astrag'alus, a genus of Dicotyledonous plants belonging to the order *Leguminosæ*. It embraces a great many species, distributed throughout Europe, Asia, and N. and S. Amer.ca. Some are found in the Arctic regions, and there are three indigenous to Britain. In Persia and Asia Minor the gum-like substance called Tragacanth (q. v.) is obtained from *A. gummifer*, and some other shrubby species. *A. Boeticus* is a native of the S. of Europe, and is cultivated for its seeds, which are roasted and used for mixing with coffee. *A. glycyphyllos*, called 'wild liquorice' from the sweetness of its roots, is occasionally cultivated as fodder for cattle. *A. alpinus* is a beautiful alpine plant found in Northern Asia, N. America, Europe, and the Arctic region. In Britain it occurs only in two localities—viz., on a lofty crag at the head of Glen Dole, in Fife-shire, and on the mountain Little Craig-an-dal, in Aberdeenshire.

Astragalus (in anatomy) is the bone of the foot which receives the weight of the body from the leg. It articulates with the tibia above, with the os calcis below, and with the scaphoid in front. It is a strong irregularly-shaped bone, and is connected with the others by powerful ligaments. For details see FOOT.

Astrakhan', the capital of a Russian government of the same name, on an island of the Volga, 14 miles from its nearest, and 36 from its farthest, mouth. It is the seat of a Greek archbishop, and has a large brick-built cathedral with five cupolas (1646), which stands within the Kremlin, a fortified square. The old town, in former times the stronghold of the Tatars of the Volga, from whom it was taken by the Russians in 1554, lay farther up the river. A., besides twenty-five other Greek churches, has two Roman Catholic, one Lutheran, and four Armenian churches, sixteen mosques, and a Lamaite pagoda. It carries on considerable trade with Khiva, Bokhara, Persia, and India, and employs not fewer than 1300 vessels. The chief exports are Russian leather, linens, woollens, caviare, salted sturgeon, and isinglass; imports, raw and spun silk, jewels, rice, rhubarb, drugs, and gold-embroidered goods from Persia. Many of the inhabitants are employed in the fisheries of the Volga, and in large salt-works near the town. Pop. (1867) 47,839.

Astrakhan, a government of Russia on the Caspian Sea, with an area of 50,000 sq. miles, and a pop. (1867) of 319,278, among whom are numbers of Kirghis, Calmucks, Cossacks, &c. It is mainly a vast barren waste of salt marshy steppes, intersected by the Volga, and has much sturgeon-fishing, and manufacture of Caviare (q. v.). The climate is one of extremes, the temperature varying from 13° F. in winter to 70° in summer.—A. is the name of a rich fur produced in Southern Russia, Persia, and Bokhara by a peculiar breed of sheep.

Æstral Spirits (Gr. *astron*, a star), in the old Eastern religions, were the spirits or souls of the stars. The belief in such spirits naturally originated from the worship of the heavenly bodies. From the Persians and Arabs it passed, with modifications, to the Greeks and Jews, and from them to the early Christian Church. Under the quickening influence of the new religious ideas it rapidly developed into a wild and wondrous system. In the middle ages, when demonology was regarded as a science, A. S. were variously conceived of, but generally as born of fire, and having no proper connection with earth, heaven, or hell. In the 15th c., when superstition and moral scepticism were both at their height, the A. S. were assigned the highest rank among evil spirits.

Astringents are medicines which have the property of diminishing secretion, repressing hæmorrhage, and giving tone to the muscular system. Nearly all A. coagulate albumen and precipitate fibrin, and they thus constrict many dead animal matters. Their specific action is to cause contraction of muscular fibre. Among A. may be mentioned tannic acid, turpentine, bismuth, acetate of lead, the mineral acids, sulphates of iron, zinc, and copper, perchloride of iron, alum, corrosive sublimate, nitrate of silver, &c.

Astrocaryum, a genus of prickly palms found in tropical America. *A. vulgare*, or Tucum palm, is cultivated in Brazil for the strong and durable fibre obtained from its young leaves, which is used for bowstrings, fishing-nets, hammocks, &c. *A. Tucuma*, the Tucuma palm, which is quite distinct from the last mentioned, yields an edible fruit, as does also *A. Murumuru*, the Murumuru palm of Para, the flavour of which resembles that of a melon.

Æstrolabe (Gr. *astron*, a star; *lahein*, to take) was the name given in the days of Ptolemy to any circular instrument used for astronomical observations. In the middle ages, however, it was used in the same sense as the word planisphere, the projection of a sphere upon a plane, and was the peculiar badge of the astrologer.

Astrology (Gr. *astron*, a star; *logos*, a word or discourse) signified originally the science of the stars, but became at length restricted to the so-called science of foretelling future events by means of the positions of the heavenly bodies. Considering the profound ignorance of the real laws of the universe, and the large area over which star-worship prevailed, it is not surprising that a belief in the influence of the heavenly bodies upon terrestrial and human affairs should have arisen in the early ages of the world. In the oldest seats of civilisation, the empires on the Nile, the Euphrates, the Ganges, and the Hoang-ho, we find the belief already established in the very beginnings of history. From Persia and Chaldæa it passed to the Jews and the Græco-Latin races, and began to be popular at Rome about the close of the Republic. The Arabs were given to A. before the days of Mohammed, but from the 7th to the 13th c., when their military and literary renown were at the highest, they cultivated it as a science with the greatest ardour. The names of Messalah, Albumazar, Ali-ben-Rodoan, Alia-ben-Ragel, Almansûr, Zahel-Bebis, were once illustrious in the forgotten roll of astrological experts. Latin Christendom received A. partly from the Moslem conquerors of Spain, partly through direct intercourse with the East, and it continued to exercise a kind of fascination over the students of physical science long after the dawn of real knowledge had begun. Cardan, Tycho Brahé, and even Kepler, clung to it, though with a relaxed hold, and it is said even yet to have obscure votaries in Europe. But the discovery of the true system of the world by Copernicus was fatal to the permanence of its hold on the educated human mind. It gradually sunk down till it finally became the property of illiterate charlatans, who seized upon its quaint phraseology to assist them in the fabrication of impudent almanacs, and it is now cultivated as a science only by Mohammedans.

Astronomy (Gr. *astron*, a star; *nomos*, a law) treats of the motions and natures of the heavenly bodies. The first step towards the foundation of such a science is observation, which, combined with mathematical operations, gives us correct ideas of the distances, magnitudes, shapes, &c., of the heavenly bodies. *Physical A.*, which dates from the time of Newton, inquires into the nature of the forces and laws which produce and regulate the heavenly motions, and gives a method of calculating these motions from those laws. *Sidereal A.* directs its special atten-

tion to the nature and characteristics of the fixed stars. *Practical A.* is the application of such knowledge to practical life, as, for instance, in the case of navigation. This branch of the subject has been termed *Mathematical* or *Geometrical A.*

A. is in all probability the most ancient, as it is unquestionably the noblest, of the physical sciences; but its very antiquity tends to throw a considerable degree of obscurity around it.

It can scarcely be disputed that the Chinese have the oldest authentic observations on record, which they assert go back 2857 years B.C. The first recorded phenomenon is a conjunction of five planets in the reign of Emperor Schuen-hin; and M. Bailly has calculated that in the year 2449 B.C. a conjunction of Mercury, Mars, Jupiter, and Saturn occurred. It is also recorded that Tchong-kang put two astronomers, Ho and Hi, to death for neglecting to announce a solar eclipse which took place in 2169 B.C.

The Hindus assert that their Tirvalore tables go back as far as 3102 B.C., the beginning of the Kali-yug or Iron Age of the Hindus, at which time a conjunction of sun, moon, and planets is said to have occurred; but they are, as far as the date is concerned, quite unreliable, and the tables bear internal evidence of being derived from more recent sources, as, for example, in the case of the equation of the moon's centre, which presents a suspicious resemblance to that of Hipparchus.

The Chaldæans, however, seem to have been the first to make really reliable observations. Porphyry and Simplicius mention that a catalogue of eclipses observed during 1903 years prior to the time of the conquest of Babylon by Alexander the Great was sent from there to Aristotle. Ptolemy, however, quotes none anterior to the year 720 B.C. It was from these records that Halley discovered the moon's acceleration—that is, that her velocity in her orbit is greater now than it was formerly.

The Egyptians were probably the first instructors of the Greeks in A., but they seem to have left behind them no valuable observations, for Ptolemy and Hipparchus were always forced to have recourse to the Chaldæan records.

The A. of Greece undoubtedly begins with Thales (640 B.C.), the founder of the Ionic school. He predicted the year of a great solar eclipse, taught that the earth was a sphere, and taught the Greeks the use of the constellation of the Little Bear in navigation. Anaximander is said to have held that the moon shone by reflected light, and that the earth had a diurnal rotation round its own axis. Pythagoras (500 B.C.), the next astronomer of eminence, was far before his age. He promulgated the true doctrine of the motion of the earth round the sun, and showed that the morning and evening stars were one and the same planet.

The next important epoch in the history of A. was the foundation of the Alexandrian school. Of the many distinguished astronomers who have made this school famous, we may mention Aristyllus, Timocharis, Eratosthenes, and Aristarchus, the last of whom is the author of a very ingenious but impracticable method of determining the distance of the sun. But of all the Alexandrians, Hipparchus of Nicæa (150 B.C.) stands pre-eminent. He discovered the precession of the equinoxes, fixed the sun's apogee and perigee, and determined the mean motion of the moon, her eccentricity, the equation of her centre, the inclination of orbit, and the motion of her apogee. His most important service perhaps to A. was his compiling a catalogue of 1081 stars.

After Hipparchus, A. seems to have made no advance for almost three centuries, till Ptolemy (q. v.), famous as the founder of the system which bears his name, appeared. The Ptolemaic system made the earth the centre of the universe, and accounts for the irregular motions of the planets by supposing each to move in a circle whose centre revolved uniformly round the earth. His greatest discovery was the libration or evection of the moon, which Hipparchus seems to have suspected.

Between the times of Ptolemy and Copernicus we must look to the Arabs for any new information regarding A. The most illustrious of these Arab astronomers were Albategnius or El Batani (880 A.D.), and Ibn-Yunis (1000 A.D.), the former of whom discovered the motion of the solar apogee, while the latter made some important observations upon the eccentricities and disturbances of Jupiter and Saturn. Trigonometry also underwent great improvements at this period.

In the 13th c. A. again began to be cultivated in Europe, the first notable evidence being the translation of Ptolemy's

Almagest, by the command of the Emperor Frederick Barbarossa, about 1230; and among others who did much to promote the science were Purbach, Regiomontanus, and Waltherus, in the 15th c.

The most eminent of European astronomers in the 16th c. was Copernicus (q. v.). Struck with the complexity of the Ptolemaic system, this great man meditated on the true system of the world for nearly forty years, and but a few months before his death published his work *On the Revolutions of the Heavenly Bodies*, in which he holds that the planets, including the earth, revolve round the sun, which is fixed immovably in the centre of the universe.

In the latter half of the same century appeared the famous Danish astronomer Tycho Brahe (q. v.), who held that the earth was fixed in the centre of the universe, and that round it revolved the sun and moon, while the planets revolved directly round the sun. His observations were of immense service to his contemporary, Kepler (q. v.), in discovering those famous laws known as Kepler's laws, and which ultimately led Newton to the grand theory of universal gravitation. About this time also Galileo (q. v.) applied the telescope to astronomical observation, adding additional evidence in favour of the Copernican system by the discovery of Jupiter's satellites and the phases of Venus.

The next great epoch was the publication of Newton's *Principia* in 1687, in which the law that holds the universe together was first revealed to the world. While physical A. was taking such gigantic strides, the astronomers proper were not idle. Three successive astronomers—royal, Flamsteed, Halley, and Bradley, made great and important discoveries—notably the aberration of light by Bradley, which proved incontestably the fact of the earth's motion. The close of the 18th c. was marked by the magnificent discoveries of Sir W. Herschel, and by the splendid analytical researches of Lalande, Lagrange, Delambre, and Laplace. The 19th c. opened with the discovery of the first four asteroids. Then followed the greatest achievement of modern analysis, the simultaneous and independent prediction by Leverrier and Adams, in 1845, of another planet more distant from the sun than Uranus. Of late years much has been done in sidereal A.; great advances have been made in the knowledge of the constitution of heavenly bodies through the aid of the spectroscopic; mathematical researches have shown the arrangement of the solar system to depend, not upon chance, but upon the conditions of stability deduced from the universal law of gravitation. For detailed information regarding the state of astronomical knowledge at the present day, the reader is referred to such special articles as PLANETS, ASTEROIDS, SUN, MOON, &c.

See Delambre's *Histoire de l'Astronomie ancienne* (Paris, 1817), *Histoire de l'Astronomie du Moyen Age* (Paris, 1819), *Histoire de l'Astronomie moderne* (Paris, 1821), and his *Astronomie théorique et pratique* (Paris, 1814), Herschel's *Outlines of A.* (1849), and Grant's *History of Physical A.* (Lond. 1852).

Astur. See FALCONIDÆ and GOSHAWK.

Asturias, now called **Oviedo**, a province in the N. of Spain, lies between 42° 57' and 43° 30' N. lat., and 4° 30' and 7° 10' W. long. It is bounded N. by the Bay of Biscay, E. by Santander, S. by Leon, and W. by Galicia. Area, 3686 sq. miles. The country descends gradually from the mountainous southern border to the N., where there are tracts of fertile land along the coast. Maize, wheat, barley, and fruits grow in the wide valleys, and there are extensive forests of oak, chestnut, and fir. Cattle and horses are reared, and fishing is successfully prosecuted on the coast. Iron, copper, lead, antimony, marble, coal, &c., are found. The manufactures are trifling. Pop. (1870) 610,883. The chief towns are Oviedo, the capital, and Gijón and Aviles, on the coast. The ancient *Astures* ('Highlanders'), allied to the Cantabri, were the last natives of the Peninsula to submit to the Roman yoke, being only subdued in the reign of Augustus. After the overthrow of the Visigothic dynasty by the Arabs, the Christian nobles found a refuge in the hills of A., where no Moslem foot ever penetrated, and its fastnesses became the cradle of the later Spanish monarchy. Here Pelayo was elected king in 718 A.D., and his successors (10th c.) became kings of Leon. Since 1388 the eldest son of the King of Spain has borne the title Prince of A.

Asylum, anciently a place to which individuals might flee for refuge, e.g., the temples and altars of the gods. The Jews had 204

cities of refuge (Num. xxxv.), and in Greece and Rome asylums became so numerous as seriously to interfere with the course of justice. Hence their sanctity came to be disregarded, and the refugees were often driven from them by force. After the establishment of Christianity, churches, and all the enclosed ground belonging to them, were made asylums; but criminals abused the privilege of sanctuary to such a degree that it was from time to time modified, and gradually withdrawn. See ASSEY. It was abolished in England by Acts passed in 1534 and 1697. The word now denotes a retreat for the destitute, and especially for lunatics. See LUNACY.

Asymptote (Gr. *asymptotos*, not coinciding) is a term applied in mathematics to a straight line which continually approaches, but never meets, a given curve. Of such curves we may mention, as the best known, the hyperbola, the logarithmic curve, the conchoid. Some curves, especially those of the higher orders, have several asymptotes. The A. may also be defined as the tangent at infinity.

Atacamite, an ore of copper originally found as sand in the province of Atacama, in Chili. It also occurs in veins in various parts of Chili, Bolivia, Australia, &c. It has a bright-green colour, and is a compound of oxide and chloride of copper.

Atahualpa, the last of the Incas of Peru, son of Huayna Capac, on whose death in 1525, seven years before the arrival of the Spaniards, he became ruler of Quito, his elder brother, Huascar, having ascended the throne of Peru. Dissension springing up between the brothers, A. made war upon Huascar, defeated and threw him into prison, and seized his kingdom in 1532. A few months later the Spaniards, led by Pizarro (q. v.), landed in Peru, and the conquest of the country was practically begun and ended by the seizure of the person of A. and the massacre of many of his chiefs, who had been invited to assemble unarmed within the square of Caxamalca, from which egress was impossible, and in which the terror-inspiring artillery of the strangers was first brought to bear upon them. With the object of purchasing his freedom, the captive A. offered as ransom to fill a room 22 feet long by 17 feet broad up to the height of 9 feet from the floor with gold. Immense quantities of plate, embracing goblets, ewers, salvers, tiles, and plates for the decoration of public buildings, representations of plants and animals, on *shells*, &c., were accordingly collected and divided among the Spaniards. A. now demanded his liberty, which Pizarro refused; and having obtained as much booty (amounting in value to £3,500,000) as could be readily obtained from A., the Spanish leader found it most convenient to put the Peruvian monarch out of the way. He accordingly accused him of plotting against the Spaniards, tried him, and condemned him to be burned—the sentence being subject to commutation to death by the *garrote*, on the condition that A. should accept the Christian religion. This A. agreed to do, and he was strangled accordingly, 29th August 1533, within a year after the arrival of the Spaniards on the Peruvian shores. See *Helps' Spaniards in Peru*, and Prescott's *Conquest of Peru*.

Atalan'ta (properly *Atalante*), in Greek mythology an Arcadian, daughter of Jasus and Clymene, was exposed on the Parthenian hill by her father, who had wished for a son. She was suckled by a she-bear, slew the centaurs who pursued her, and took part in the hunt of the Calydonian boar. The condition she imposed on those who sought her in marriage was that they should outstrip her in the foot-race, or suffer death. A suitor named Meilanion, dropping three golden apples, the gift of Venus, A. stooped to gather them, and, being defeated, became Meilanion's wife.—The Boeotian A., about whom the same myth is told, is probably identical with the Arcadian A.

Atarapu, or 'Devil's Rock,' a remarkable granite peak in British Guinea, which springs abruptly from the plain to the height of 900 feet.

Atavism is a term now employed by physiologists to denote the tendency to a reversion to ancestral form which is observed in successive generations of certain animals and plants. It is well known, for example, that from the common rock pigeon (*Columba livia*) no fewer than 160 distinct races of domestic pigeons have been produced. It has been observed, however, by Darwin and others, that in many broods of pure varieties,

such as fan-tails, tumblers, or pouters, individuals appear resembling the ancient progenitor, the blue rock. The same tendency to the reappearance of peculiarities of progenitors in their offspring, even after many generations, has been observed in other animals. Even in the human genus similar facts occur, and occasionally in a family an individual is born unlike in many respects father, mother, sisters, or brother, but reproducing not only the outward form, but even the mental qualities of an ancestor. See DARWINISM, PANGENESIS.

Atchafalaya Bayou, an outlet or branch of the Red River, which enters a bay of the same name in the Gulf of Mexico, after a course of 130 miles. It strikes off just before the Red River joins the Mississippi, and is navigable for steamboats.

Atchevement. See HATCHMENT.

Atchin', or **Acheen'**, a Mohammedan kingdom in the N.W. of Sumatra, strong enough in former times to drive the Portuguese from the island, extends from 95° 20' to 97° 40' E. long., and from 2° 50' to 5° 40' N. lat. Area, 2260 sq. miles; pop. 500,000. It is comparatively healthy, and is intersected by a chain of lofty and rugged mountains. Its chief heights are Abong (11,000 feet), Loose (11,000), Golden Mountain (6460), and Batu Capit (6155). The natives, active and sagacious, but perfidious, traffic largely in gold-dust, pepper, camphor, sulphur, benzoïn, betel-nuts, edible nests, and satin-wood, receiving in exchange opium, cotton stuffs, and arms. In 1873 Holland declared war against the Sultan of A., having gained the acquiescence of England by a cession of territory on the Gold Coast, but the Atchinese unexpectedly met the hostile expedition with a stubborn and disastrous resistance. But in January 1876, and after severe loss, A. was still unconquered by the Dutch. The capital, A., stands near the mouth of a river, in a valley overshadowed by hills, and has 36,000 inhabitants.

A'te, daughter of Zeus according to Homer, but of Eris according to Hesiod, a goddess who prompted gods and men to rash deeds, and to consequent suffering. The name signifies 'mischievous folly,' and in the Homeric poems she is nothing more. As such, Zeus banishes her from Olympus for causing Eurystheus to be born before Heracles. In the tragedians, she becomes a fate or doom resting on a house after the shedding of innocent blood, and almost identical with Nemesis and Erinys.

Atelec'tasis is a peculiar condition of the lungs of infants, in which a portion of the organs does not become filled with air. The lungs appear healthy, but they remain in the foetal condition. Dr Jörg of Leipzig, who has investigated this subject, regards the condition as a diseased state of the lungs. He points out that any circumstances likely to weaken the vital powers of the child before birth are liable to be followed by A. A child may live for several days with portions of the lungs in this condition. If the parts are not soon dilated, they become so consolidated that all trace of air-cells is lost. In some cases the ductus arteriosus, which during foetal life carries blood from the pulmonary artery to the descending aorta, is not quickly closed, so that little blood passes to the lungs even after birth. In these circumstances A. occurs.

A'teles, a genus of Platyrrhine monkeys, or Quadrumana, found in S. America, and popularly known as spider monkeys, from the extreme length of the limbs, and their agile nature. The tail is very long and prehensile, and thus serves as a fifth hand. The thumbs are absent or rudimentary. *A. paniscus* and *A. arachnoides* are familiar species. See MONKEYS and QUADRUMANA.



Ateles.

France. This was strongly illustrated in the establishment of the A. N., and in the results. The principle was that all work-

men were entitled to the means of living, whether able to provide this for themselves or not; and that the rate of payment should be on a uniform scale, without having regard to the merits of the workman. The system was of course highly attractive to a great number of men; but it proved too attractive. It was soon found that there were over one hundred thousand people to be provided for, and that the trade of Paris was fast going to ruin. The experiment was wound up by a bloody battle, and by the restoration of despotism. It is hardly worth while to refute the absurd doctrine involved in the establishment of the A. N. If the skilful and the unskilful, the industrious and the slothful, are to be all paid alike, the result is self-evident.

Atella'næ, or **Atellanæ Fabulæ**, improvised farces, which afterwards came to be written, were introduced at Rome from Atella, in Campania. The interlocutors, who used the Oscan dialect (hence their other name, *Ludi Oscî*, 'Oscan Sports'), represented various classes of country-people. The humour was not coarse, and neither dancing nor obscene buffoonery was permitted, as in the mimes. It is thought that the modern Italian *arlechino* (harlequin) is derived from this source. Free-born Romans acted in the A. without incurring degradation. The names of several writers of A. are known, as Fabius, Dorsennus, Quintus Novius, Lucius Pomponius, and Mummius. Bothe has published fragments of the A. in his *Podarum Latinorum Sceniorum Fragmenta* (Leipz. 1834).

A Tempo (Ital. 'in time'), a musical term used after any alteration in the time, to denote a return to that originally marked. *A T. giusto* means that every note must receive its exact value in time.

At'esgha (Pers., 'the place of fire'), a naphtha spring on the peninsula of Apsheron, on the W. side of the Caspian Sea. It emits in dry weather a bright flame, which the Guebres (q. v.), who visit it, reverence as 'holy fire.'

Ates'sa, a town in the province of Chieti, S. Italy, 23 miles S.S.E. of Chieti. Pop. of commune, 9171.

Atou'chus. See BEEFLES and SCARABÆUS.

Ath, a town in the province of Hainault, Belgium, on the navigable river Dender, 12 miles N.W. of Mons. It has large manufactures of linen, calico, gloves, lace, cutlery, and heavy hammers, and also carries on an active trade in coal and grain. Its oldest structure is a tower, La Tour du Burbant, which dates from 1150. The church of St Julien, built 1393, had a beautiful spire 150 feet high, which was destroyed by lightning in 1817. A. was thrice taken by the French, in 1697, 1745, and 1792. The English and Dutch allies, under Owerkerke, also took it in 1706. It is now strongly fortified, and has an arsenal hospital, and college. Pop. 8050.

Athabas'ca, a lake in British N. America, lat. 59° N., and between 106° and 112° W. long. Length about 200 miles, breadth about 20 miles. It is fed by a river of the same name, which rises in the Rocky Mountains, near Mounts Hooker and Brown, flows N.W., and falls into the lake at its S.W. extremity. The river A. then emerging on the N. side, joins the Peace, changes its name into Slave River, and discharges itself into the Great Slave Lake, about 170 miles to the N.E. of Lake A.

Athali'ah, daughter of Ahab and Jezebel, and wife of Jehoram, King of Judah. On the death of her son Ahaziah, who had succeeded Jehoram, she 'destroyed all the seed-royal,' that she might reign alone. But Joash, the youngest son of Ahaziah, was saved by his aunt Jehosheba; and after having been 'hid in the house of the Lord six years,' was placed on the throne by Jehoiada, the high priest (878 B.C.). A., astonished to find one whom she supposed dead invested with royalty, shouted 'Treason!' but by the orders of Jehoiada she was conveyed beyond the precincts of the temple, and slain in the gateway of the king's house (2 Kings xi. 16).

Athan'aric, a king of the Western Goths in the 4th c. He was attacked by the Emperor Valens, against whose arms he maintained himself during two campaigns, but was defeated in a third (369 A.D.), when a peace was concluded. Soon after, the Huns, an Eastern Turanian race, burst into the settlements of the Goths, in the plains of Dacia, and committed such havoc

that the Goths implored the aid of the Roman emperor. In 374 they were provided with settlements on the S. of the Danube. A., however, did not accompany them, but retired westward, whence he was soon compelled to retreat by fresh attacks from the irresistible savages, who had wasted the plateaus of Asia from the borders of China. Repairing to Constantinople in 380, he was received with great pomp by the Emperor Theodosius, with whom he concluded a treaty, the effect of which was the incorporation of the Western Goths with the other subjects of the empire. A. died in 381, having, it is said, surfeited himself at the emperor's table.

Athanasian Creed. Before the questions regarding the nature of the person of Christ which agitated the Church after the Council of Nicæa were decided, the so-called A. C., although never sanctioned by any general council, was adopted by the Western Church. The substance of its contents is a full and unmistakable statement of the doctrines of the Trinity and of the Incarnation. It has come now to be almost universally agreed that Athanasius was not the author of it, but that, according to a very prevalent fashion of the time, it was merely fathered upon the great opponent of Arianism in order to give it a factitious value. As it contains allusions to subsequent controversies regarding the person of Christ, its composition is referred to some period between 450 and 550; there is no indication of its being received as authoritative before 800. As an exposition of doctrine, it is received by all the Protestant Churches, as well as the Roman Catholic; but its peculiar use in the public worship of the Church of England has given rise to a bitter controversy, many both of the clergy and the laity objecting strongly to the continued use of what used to be called the damnable clauses, by which it is declared that any one who does not believe the whole, 'without doubt he shall perish everlastingly.' In deference to the outcry against these clauses, there is now a tendency on the part of those who wish to retain them to smooth down the interpretation put upon them, and such euphemistic names as *minatory*, *monitory*, *cautionary* clauses, are much in vogue.

Athanasius, a Christian theologian who has made a lasting impression on the creed of the Church, was born at Alexandria about 298. He was ordained a deacon in 319, and became the chief counsellor of his bishop, Alexander, whom he accompanied to the Council of Nice. The following year (326) Alexander died, and A. was elected bishop and patriarch. When ordered by the emperor soon after to restore Arius to his pastorate in Alexandria, he refused. He was thereupon cited to appear before a council at Cæsarea (334), which he refused to do; but, at the peremptory command of the emperor, he appeared at one held at Tyre next year, and many absurd charges having been brought against him, he was deposed. He was again condemned by a council held at Rome next year, and banished to Treves in the W. of Europe. In 338 he was allowed to return to Alexandria, but disturbances having arisen, owing to disputes with the Arians, and the latter being at the time in the majority, the Council of Antioch (341) decreed that no deposed bishop could ever return to his see. A. fled to Rome, where a council acquitted him of all the charges laid against him, a decision which was confirmed by the Council of Sardica (344). In 347 A. was permitted to return to his see; but in 350, Arianism being again in the ascendant, he was once more accused and persecuted. He was condemned by the Council of Arles (354), and that of Milan (355). He concealed himself at Alexandria for two years, and then retired to the desert of Egypt, where he composed most of his best works. On the accession of the Emperor Julian (361), he returned to his see. Having given offence to the pagans, however, by reviling their religion, these joined with his Arian enemies, and prevailed on the emperor to banish him again (363); but the emperor died the same year, and he returned to Alexandria, to be once more expelled in the reign of Valens, and again restored by the prayers of his party. A. died in 373, at the age of seventy-five. His writings are chiefly directed against the Arians in relation to the doctrine of the Trinity. See **ARIUS** and **COUNCIL OF NICE**. It cannot be denied that to his indefatigable zeal and fearless ardour in the cause of orthodoxy the Church owes its profound sympathy with the Trinitarian creed. He created the belief in the greatness of the controversy. Clear, strong, and deep in his thinking, he left on the heart of Catholic Christianity an indelible conviction that Christ is God. Before this potent

mystery of faith even the fierce energy of the Arian Teutons finally gave way, and in less than three centuries after his death the triumph of his doctrine was absolute and universal. The first edition of A.'s works appeared in a Latin text at Vicenza (1482). The Greek text, with the Latin translation of Nannius, was first published at Heidelberg (1600). The best edition is the Paduan of 1777.

Atheism (Gr. *atheos*, godless) is the creed of the atheist. Perhaps the first mention of atheists is made by the apostle Paul, who calls the Ephesians (Eph. ii. 12) in their immoral, pagan state, 'atheists in the world,' meaning that they had lived as if there were no God; according to which definition multitudes of professed Christians would belong to the class. The proper meaning of an atheist is one who denies the existence of a God; but popularly the term has been applied to all who reject the vulgar notions about God. The first atheists in this sense were the Greek philosophers who, disgusted with the coarse polytheism of their countrymen, first denied that any truth was attainable on such subjects, and then held that, though there might be supernatural beings, they stood in no moral relation to man. Atheists, then, in the popular sense, are those who refuse to reverence and pay homage to a being whose attributes and actions, according to the popular creed, shock their moral nature, while reverently retaining, it may be, conceptions of their own about a divine being. Real atheists are those who, from indifference, or some worse motive, reject the popular creed, without taking the trouble to consider whether it is true or false, or whether there is any truth in it whatever.

Athelney, Isle of, a patch of dry land, about 100 acres in extent, in a marshy district near the confluence of the Tone and Parret, Somersetshire. It was the temporary refuge of King Alfred, who here erected a Benedictine abbey in 888. The name, originally *Æthelins gæig*, means 'island of the nobles.' A gold ornament found here, bearing the name of Alfred, is preserved in the Ashmolean Museum, Oxford.

Athelstane, more correctly **Æthelstan**, grandson of Alfred the Great, was born about 893 A.D., and succeeded his father, Eadward the Elder, in 925. In some respects he was the greatest of the English kings before the Conquest. None triumphed more splendidly in the field, or exercised greater authority as a sovereign. The battle of Brunanburh (937), in which he utterly crushed a formidable coalition of Danes, Scots, Strathclyde Britons, and Welsh, and the glory of which is commemorated by a splendid chant in the *Chronicle*, virtually made him master of the island, and justified the title, which he was the first to adopt, of *Emperor of Britain*. His father Eadward had indeed prepared the way for the assumption of this dignity by the son, for at his death he was 'King of the English' and 'Lord of all Britain,' but A. was the first who made his monarchy indisputable. The French king, the Celtic princes of Bretagne, found a refuge at his court; the son of Harald of Norway was sent thither to be educated. A. reformed the national laws, built monasteries, and fostered literature. He died at Gloucester in 940, in the forty-seventh year of his age. No English prince before his time had ever possessed so much influence abroad, or so much power at home.

Athensum (Gr. *Athenaion*).—1. The Temple of Athene (Lat. Minerva) at Athens.—2. A college at Rome, founded by the Emperor Hadrian, with a staff of professors in rhetoric, philosophy, and law, to which young men resorted from all parts to finish their education. It was in high repute till the 5th c. The name is now frequently adopted by literary and scientific institutions, and is also borne by more than one important review.

Athensus, of Naucratis, in Egypt, a litterateur, called, on account of his erudition, the 'Varro of the Greeks,' flourished at the beginning of the 3d c. His *Banquet of the Learned* (*Deipnosophista*, lit. 'The Sophists at Dinner'), in the form of a dialogue, exhibits no dramatic power, but is an exhaustless fund of anecdote, extract, and criticism from the commonplace-book of a Greek gentleman of the 3d c. fond of reading and good eating. He cites more than 1200 books. What we possess is only an abridgment. The idea of the work is this: Twenty-one artists and men of letters, among whom are musicians, poets, grammarians, philosophers, doctors, and lawyers, are supposed to be brought together at a feast given by a rich Roman named

Laurentius or **Laurensis**. In their conversation everything comes up that belongs to the social usages of the Greeks—meats, wines, perfumes, garlands, flowers, vases, sports, &c.—nothing is overlooked. The best edition is by Dindorf (3 vols. Leipz. 1827). It is translated into English in Bohn's *Classical Library*.

Athenag'oras, an Athenian proselyte to Christianity, author of an *Apology*, or, as he styles it, an *Embassy* (Gr. *Presbeia*) for *Christians*, addressed to the Emperor Marcus Aurelius and his son Commodus, 177 A.D., in which, with much elegance and force, he defends his co-religionists from the charges of atheism, incest, and cannibalism, usually brought against them. He also wrote a treatise on the Resurrection. A. is considered one of the ablest of the early Christian apologists. The best edition of his works is that by the Benedictines, published in 1742 at Paris, along with the writings of Justin Martyr and others. A. has been translated into English, and forms, along with the translation of Justin Martyr, a volume in Clark's *Ant-Nicene Library* (Edin. 1867).

Athena'is, daughter of Leontius of Athens, born about the close of the 4th c. A.D., celebrated for her learning and beauty. On the death of her father she went to Constantinople, and made so favourable an impression on Pulcheria, the sister of Theodosius II., that she brought about a marriage between her and the emperor, A. having been previously baptized and named Eudocia (421 A.D.). In 438 A.D. A. brought the relics of St Stephen from Jerusalem, whither she had gone on a pilgrimage. In consequence of a quarrel with the emperor, she retired to the Holy Land, and died at Jerusalem 460 A.D., and was buried in the church of St Stephen, built by herself. She wrote several poems, which have been lost.

Athens, the capital of ancient Attica, is said to have been founded by Cecrops, the mythical hero of the Pelasgian race, to whose reign there is no historical basis for assigning any date. The tradition that Erechtheus introduced the worship of Athene, and built a temple to the goddess on the Acropolis, whence the name A., is also of doubtful antiquity. The city, originally confined to its Acropolis, was afterwards extended over the plain and the adjacent hills. The Acropolis, called by Pindar the 'navel of the city,' was an irregular oval, 1000 feet in length by 500 feet in breadth, while its summit was 150 feet above the plain. It was inhabited down to the Persian wars, when it was reserved for a fortress and a sanctuary. The first enlargement of the city beyond the bounds of its fortress rock was made by Theseus, to accommodate that increase of population which followed his organisation of the twelve independent Attic states into a confederacy, with A. for its capital. Connected with the N.W. angle of the Acropolis was the craggy height of the Areiopagus; S.W. arose the Pnyx, on which the citizens held their assemblies; and S. of the Pnyx was the hill known as the Museum. On these heights, and on the ground reaching southward from the Acropolis to the Ilissus, the principal public buildings were erected; but the city itself gradually extended toward the N. To the E. and then S. of the city ran the Ilissus, and W. the Cephissus, two small streams, nearly dry in summer, emptying into the Phaleric Bay. To the S. lay the Saronic Gulf, with the three harbours of A., the principal of which, the Peiræus, was connected with the city by a carriage-road between the two Long Walls, erected by the advice of Pericles, to preserve an uninterrupted communication between the city and its harbour during the continuance of a war. The other two harbours were Phalerum and Munychia.

The Acropolis was so covered with masterpieces of art, that it may be regarded as having constituted a museum crowded with objects of inestimable value. Architecture, sculpture, and painting were equally represented. The Propylæa, at once a fortress and an imposing work of art, formed the entrance to the Acropolis. When the gates were opened, a cluster of imposing objects met the view. Conspicuous above the rest were, on the left, the colossal bronze statue of Athene Promachus, the loftiest object in the Acropolis, and on the right the Parthenon, whose harmony and grand proportions, even in its ruins, make it still one of the wonders of the world. Opposite the Parthenon, on the N. side, stood the Erechtheum, containing the olive-wood statue of Athene Polias, the most venerated of Athenian relics, as believed to have fallen from heaven. Statues, shrines, and

smaller temples covered the rest of the area. The Areiopagus, on whose summit met the famous council, was connected in the Athenian mind with the most sacred associations, and it is no less sacred to the Christian as the scene of Paul's memorable discourse to the 'men of A.' On the Pnyx was the Bema, or tribunal from which the orators addressed the people, and before which the citizens assembled at daybreak—the heat of the sun being intolerable at noon—to listen to such orations as those of Themistocles and Demosthenes; while close to the south-eastern angle of the Acropolis was the Dionysiac theatre, capable of holding more than 20,000 persons, where the citizens could listen to the masterpieces of Sophocles, Euripides, and Aristophanes, while their eyes rested on the flanks of Hymettus, and on the waters of the Saronic Gulf. The great Temple of Olympian Zeus, commenced by Pisistratus, and finished by Hadrian, the greatest temple ever erected to the supreme deity of the Greeks, contained the statue of the god in ivory and gold, the workmanship of Phidias. The Academy of Plato—Milton's 'olive-grove of Academe'—the Lyceum, where Aristotle expounded his philosophy, and the Cynosarges, a gymnasium set apart for persons not of pure Athenian blood, where the cynic Antisthenes held his school, are memorable as educational centres in A. The best preserved monument of ancient A. is the Temple of Theseus, at once a sanctuary and a tomb. Another well-preserved structure is the Horologium, or octagonal Temple of the Winds.

Theseus, who has been already mentioned as having selected A. as the capital of the confederacy of the Attic states, divided the citizens into the three classes of nobles, agriculturists, and mechanics. The government was monarchical till the death of Codrus in 1068 B.C., when archons were elected from the nobility, at first for life, next for a period of ten years, the office being still dynastic, or confined to the family of Codrus; and in 684 B.C. the office was made annual, its duties being divided among a college of nine, chosen from the patricians generally. The government was thus an oligarchy. Solon, in 594 B.C., introduced, though with extreme caution, the elements of a democratic constitution. The great landowners held in pledge for debt the persons of the mass of the population, who, driven to desperation, were prepared for revolt. He forbade for the future the pledging of one's own person, or the persons of members of his family, for debt, and gave all freemen a vote in the elections of the archons. The basis of the constitution was extended by Cleisthenes (510 B.C.), when the government became a pure democracy. The victories of Miltiades at Marathon, and of Themistocles at Salamis, while they shattered the resources of the Persians, gave new life and hope to Greece. In 444 the glory of A. culminated under Pericles, but the seeds of decay were planted by the declension of morals. The capture of the city in 404 by the Lacedæmonians was followed by a brief glimmer of prosperity, but the defeat at Charoneia (338 B.C.) made A. subject to Macedon. The old spirit of freedom was dead. The yoke of Macedon was indeed thrown off, but only to be succeeded by the sterner yoke of Rome. Sulla destroyed the Peiræus; he inflicted, however, no further outrage; and for ages Rome sat as a docile pupil in philosophy and art at the feet of her illustrious captive.

The census of Demetrius Phalæus, taken B.C. 317, gave 527,000 as the aggregate of the whole population of Attica. A. contained at least a third of this number, which agrees very nearly with the estimate of Böckh, who reckons the population of the city and harbours at 180,000. Of these, for each free-born person, or alien resident, there would be, at the lowest calculation, three slaves. Among the most striking episodes in the history of A. are its devastation by Xerxes, B.C. 480; its capture, and the destruction of the fortifications, by the Lacedæmonians, B.C. 404; its subjection to Macedonia, B.C. 338; its capture by the Romans under Sulla, B.C. 86; and the renewal of its splendour under Hadrian and the Antonines. After the abolition of the schools of philosophy by Justinian in the 6th c., its temples were converted into churches, the Parthenon becoming the church of the Virgin Mother, while the Temple of Theseus was dedicated to St George of Cappadocia. The Goths forced their way into the city in A.D. 267; and in A.D. 396, Alaric, during his invasion of Greece, consented to enter the city as a guest, since its defences were too strong for his barbaric soldiery. A. was in the hands of the Latins from 1204 till 1456, when it was incorporated into the Turkish empire, and the church of the Virgin Mother was converted into a mosque. In

1687 the Venetians, under Morosini, captured the city, when an explosion of gunpowder, placed in it by the Turks, reduced the Parthenon to a ruin. The Turks got possession of the city in the following year. For a century the finest remains of antiquity were used as quarries, and marble statues of inestimable value were calcined to obtain lime. After the War of Liberation, A. was in 1834 declared the capital of the new kingdom of Greece; new streets were built, of which the most noteworthy are the *Hermes*, *Æolus*, and *Athens*, and the royal palace, begun in 1836, was finished in 1843. The University of A. (founded 1834) is attended by between 500 and 600 students, and has a large staff of professors and tutors. The trade of the city is insignificant. Pop. (1871) 44,510.

Athens, a town of Georgia, U. S., on the Oconee river, 92 miles N.W. of Augusta. It has a college called Franklin College, and is the centre of a rich cotton-growing district. Pop. about 4000. A. is the name of over twenty other places in the United States, of which the most noteworthy is the A. of Ohio, 72 miles S.E. of Columbus, and the seat of Ohio University. Pop. about 2000.

Atherina, a genus of fishes belonging to the Mullet family (*Mugilidae*), and represented by the sand smelt (*A. Presbyter*). These forms are sometimes included in a distinct family, that of the *Atherinidae*. They are small fishes, about 6 inches in length, and inhabit the southern coasts of Britain. They ascend rivers with the tide. These fishes are sold in many provincial markets as true 'smelts.'

Atheroma is a name given to a disease of the lining membrane of the arteries. Severe strain on the vessels, or a peculiar constitutional taint, as in gout, leads to a chronic form of inflammation. This causes an exudation on the inner surface of the lining of the vessel, giving rise to broad elevations of an opaque yellowish-white appearance. The effused matter may subsequently undergo degenerative changes. The principal effect of A. on the blood-vessels is a diminution of the elasticity of their coats.

Atherstone, a market town in Warwickshire, 16 miles N.E. of Birmingham, on Walling Street, the old Roman road to the N., with manufactures of hosiery, ribbons, and hats. Pop. (1871) 3667.

Athlete (Gr. *athlētēs*, a combatant, especially a prize-fighter), a competitor for the prizes in the Greek games. The Greek A. held an entirely different social position from that of the modern prize-fighter, and stringent inquiries were made as to his birth, position, and character. The most illustrious philosophers entered the lists, at least as *amateurs*, if not as *professionals*, e.g., Pythagoras, Plato, Chrysippus, and Cleanthes. The victor in the Olympic games brought so much honour to his city, that a breach was made in the walls to admit him on his return, through which he passed in a chariot drawn by four white horses; he was maintained at the public expense, and at his death had a public funeral. M. Fulvius introduced athletic contests at Rome 186 B.C., at the close of the Ætolian war, and during the empire they became extremely popular, but never attained the dignity they held in Greece.

Athlone (*Ath-Luain*, the ford of Luan, originally *Ath-mor*, the great ford), a town and strong military station, partly in the county of Westmeath and partly in that of Roscommon, lies on the Shannon, three miles below Lough Ree. It has manufactures of felt hats, friezes, soap, and beer. The Shannon is here crossed by a handsome stone bridge and an iron railway bridge. A. Castle was built in the reign of King John, and near it, in late times, have been erected barracks for 3000 men, and fortifications 15 acres in extent. A. returns one member to Parliament. Pop. (1871) 6565.

Athole (Gael. 'pleasant land'), a hilly region in the N. of Perthshire, at the S. base of the Grampians, 450 sq. miles in extent. It was formerly one of the best Scotch hunting districts, and its forest still contains about 6000 head of deer. The most famous spot in A. is the Pass of Killiecrankie, about 17 miles N.W. of Dunkeld, where Claverhouse fell in 1689. A. gives the title of duke to the ancient house of Murray.

Athor, or **Athyr**, properly *Het-her* (i.e., 'dwelling of God'), the name of an Egyptian goddess of the second class, 208

daughter of Ra, the sun, and identified by the Greeks with Aphrodite. Her symbol was the cow; and sometimes she is represented with the sun's disc between her horns, and sometimes with a temple on her head. Her chief sanctuary was at Denderah. The third month of the Egyptian year, corresponding to our November, was named after her.

Athos, **Hag'ion-Oros** (whence the Turk. *Aineros*), or **Monte Santo**, the Holy Mount, so called from the numerous monasteries with which it is covered, a lofty mountain at the extremity of a Macedonian peninsula projecting into the Ægean, between Gulfs Contessa and Monte Santo, 6349 feet above the sea-level. Herodotus gives the names of five towns that were built on A. Xerxes cut a canal through the isthmus, of which traces are still visible. The principal village in the peninsula is Karyæ, with a pop. of 1000. The monasteries, having about 8000 monks (who devote themselves to agriculture, gardening, and the care of bees, and are abstinent, not ascetic, in their mode of life), constitute a kind of republican federation, under the suzerainty of Turkey, to which they pay a yearly tribute of about £4000. The largest are Ivoron and Hagia-Laura; the richest, Vatopædi. Their libraries, of which nearly every cloister possesses one, are now much neglected. Besides printed works, they are rich in old and beautiful MSS., many of which have been brought to Western Europe by fortunate scholars. Classical literature is not well represented, but its ecclesiastical MSS. are valuable, particularly those in the Georgian language at Ivoron, and in the Old Slavic or Bulgarian language at Docheiру. Paintings and frescoes are numerous, and assist greatly in giving us clear ideas of Byzantine Christian art. Those at Hagia-Laura and Vatopædi, ascribed to Michael Panselinos, are particularly interesting. See Pischon, *Die Mönche Republik des Berges A.* in the *Histor. Taschenbuch* (Leipz. 1860).

Athy ('ford of Ae,' a Munster chief who fell here in one of the half-fabulous conflicts of early Irish legend), a town of Kildare, Leinster, on the Barrow, where it is joined by the Erand Canal, 33 miles S.W. of Dublin. A. is of some note in the early history of the country, and was taken and plundered by Edward Bruce in 1315. It is a station on the South-Western Railway, and exports grain. Pop. (1871) 5693.

Athyrium, a genus of graceful ferns closely allied to *Asplenium*. See FERNS.

Atlanta, a city of Georgia, U. S., 69 miles N.W. of Milledgeville, in a district rich in cotton and grain. It was founded in 1845, and became a flourishing centre of trade, and the focus of the four chief railways of the state. General Sherman, after two sanguinary battles, 22d and 28th July 1864, forced the Confederates to evacuate the city, which he subsequently destroyed, but which has since recovered something of its old prosperity. Pop. (1870) 21,789.

Atlantes was the name given in the architecture of the Greeks to male figures more or less colossal in size, which, like the female caryatides, were used instead of columns or pilasters to support entablatures, and even the beams of public structures. Examples of such A. were obtained from the baths of Pompeii. The Romans also called them Telamones, in allusion to Ajax, the handsome Hercules of the Trojan War.

Atlantic Ocean, the great thoroughfare between the Old and New Worlds, washes the eastern shores of America and the western shores of Europe and Africa; stretches from the Arctic Ocean in the N. to the Antarctic Ocean in the S., a distance of 9000 miles; presents a most irregular boundary in the northern hemisphere, giving off numerous and extensive ramifications, such as Baffin and Hudson Bays, Gulf of St Lawrence, Bay of Fundy, Gulf of Mexico, and the Caribbean Sea, on the American side; the North Sea, Baltic Sea, English Channel, Bay of Biscay, and Mediterranean Sea, on the European side; and is bounded towards the S. by the bold unbroken coasts of Africa and S. America. Its breadth varies from 900 (between Norway and Greenland) to 4000 miles (between Morocco and Florida); and its computed area is about 25,000,000 sq. miles.

The principal islands studding its broad expanse are Iceland, Faroe, Bermudas, Azores, Ascension, St Helena, the Falkland Islands, S. Georgia, and Sandwich Land.

It is only within recent years that the nature of the A. O. at different depths, and of animal life abounding at these depths,

has been at all made out; and what is known has been obtained from the expeditions of H.M.'s ships *Porcupine* and *Challenger*. Animals are found at much greater depths than was formerly supposed, and several new species of invertebrata have been discovered. The greatest depth measured by the *Challenger* was at a point about 90 miles off St Thomas, W. Indies, where the soundings reached 23,250 feet. The 'Telegraph Plateau,' along which the Atlantic cable is laid, is a remarkable ridge about 400 miles wide, extending along the bottom, at a depth of from 10,000 to 12,000 feet, from Cape Clear in Ireland to Cape Race in Newfoundland.

In the A. there are two great currents, known as the Equatorial Current and the Gulf Stream, which latter may be regarded as a continuation or offshoot of the former. See CURRENTS, OCEAN.

Over the whole of the eastern portion of the A., from lat. 45° northwards, the prevailing winds are S.W.; and this, together with the warming effect of the Gulf Stream, considerably ameliorates the winter climate of the western coast of Europe. The isothermal lines, or lines of equal temperature of the A., show remarkable peculiarities. The temperature reaches a maximum in the equatorial regions, and from thence it diminishes towards the poles; but owing to the Gulf Stream, the lines in N. temperate regions, and especially during the winter season, are excessively eccentric. Besides varying with latitude, the temperature of the water diminishes as the depth increases; and the rate of diminution also decreases, thus affording an argument in favour of the internal heat of the earth.

Atlantic Telegraph. See TELEGRAPH, SUBMARINE.

Atlantis ('the island of Atlas'), first mentioned by Plato in his *Timæus* and *Cratylus*, in an imaginary conversation between Solon and a priest of Sais, in Egypt, in which it is represented as lying in front of the Pillars of Hercules, and as being larger than Libya and Asia Minor taken together. Some consider it to have been part of the W. shores of Europe or Africa, while others assign it to the New World, on the shores of which they suppose Phœnician merchantmen may have been at some time driven, and hence the tradition, of which they may have brought home the news that gave birth to the tradition. The name furnished Bacon with the title of his political romance, *The New Atlantis*.

Atlas, a son of Japetus and Clymene, according to Hesiod, though Apollodorus and Hyginus assign him each a different parentage. For having led the Titans in their attempt on heaven, Zeus condemned him to bear the heaven on his head and hands, though the myth has been explained by representing A. as having been skilled in astronomy, and the first who taught that heaven had a globular form. The name A., applied to a collection of maps, was first used by Mercator in the 16th c.

Atlas, a large mountain range in N.W. Africa, stretching from Cape de Ger in a N.E. direction through Morocco, and thence E. through Algeria and Tunis, till it is gradually lost in the wastes of Tripoli. The A. is less correctly described as a single range than as a vast mountain mass containing many ranges connected by ridges, and several outlying mountains of great elevation; but still one can clearly enough discern a coast-range parallel to the Mediterranean, and another more to the S., overlooking the desert. The A. culminates in the peak of Mitsin, one of the *Jebel-el-Thelji*, or 'Snowy Mountains' of Morocco, which is 13,000 feet high, but the elevations decrease gradually towards the E. The mountains are clad on the N., W., and S. with forests of valuable timber, and contain much mineral wealth, which, however, has not as yet been developed. They are intersected by numerous fertile valleys, capable under proper cultivation of yielding valuable crops.

Atlas (in anatomy) is the first vertebra, and is so named because it supports the head. It differs from the other vertebræ in having no body, that part being represented by the odontoid process of the axis or second vertebra. It articulates above with the condyles of the occipital bone, and below with the axis. For details see VERTEBRAL COLUMN.

Atmosphere (Gr. *atmos*, vapour, and *sphaira*, a sphere) is properly the gaseous envelope of any celestial orb; but, when used without any qualifying adjective phrase, it applies only to

that of the earth. As regards the atmospheres of the sun, planets, and satellites, the little we know of them will be found under the special articles on these bodies.

That the A. had weight was suspected by Aristotle, and asserted by Epicurus; but till the experiments of Otto de Guericke and Torricelli, which proved that the air could be weighed and exerted an enormous pressure, it was commonly accepted that the A. was imponderable. The latter showed that this pressure at the earth's surface was capable of equilibrating a column of mercury 30 inches high, from which it follows that the A. exerts a pressure of 14 lbs. on every square inch of the earth's surface. This pressure must obviously decrease as the height above the sea-level increases; but the law according to which this takes place is extremely complex even in theory. Besides this, however, the pressure varies also with the latitude, the maximum being about the 30° or 40° parallel; but it has been stated that there is a second maximum at the pole. Lines drawn through localities having the same mean annual atmospheric pressure are termed *isobaric* or *isobarometric* lines. Further, the pressure of the A. is subject to diurnal and annual variations, in both of which there are two maximum pressures, and consequently two minima. In the former periodic variation, the maxima occur at 9:37 A.M. and 10:11 P.M., and the minima at 3:45 A.M. and 4:5 P.M. In the latter, the maxima occur in midsummer and midwinter, and the minima at the equinoxes.

As regards the true height of the A., little is definitely known, since great discrepancies exist between results obtained by different methods. Thus, from the duration of twilight, the depth of the atmospheric sea surrounding our earth was fixed at 45 miles; Sir W. Herschel fixed the height of an aurora, which is almost indisputably an atmospheric phenomenon, at 83 miles; while M. Lias, from experiments on the polarisation of the sky, determined the height of the A. at 212 miles.

The law of the variation of the density with the altitude may be stated thus: as the height increases in arithmetical, the density diminishes in geometrical, progression. This law, however, is not strictly true, on account of the imperfect gaseous characters of the air. According to thermo-dynamic principles, change of density should produce change of temperature; and this is found to be the case, but the law regulating this variation has not been as yet fully investigated.

Chemical Composition of the Atmosphere.—Just a century has elapsed since Lavoisier proved that the air is a mixture of the two gases oxygen and nitrogen, and showed that they were present in the proportion of $\frac{1}{4}$ of the former to $\frac{3}{4}$ of the latter. Before the time of the great French chemist, air was believed to belong to the elements, and was classed with earth, fire, and water. A further analysis of the ingredients of the A. has shown that in addition to the two substances already mentioned, it contains a small but variable amount of carbonic acid, and aqueous vapour, also traces of ammonia and organic matter, and sometimes other impurities, such as nitric and sulphurous acids, sulphuretted hydrogen, carbonic oxide, &c., these being derived from local sources. The fundamental ingredients are, however, oxygen and nitrogen, both of which exist in the air in the free or uncombined condition, and not in chemical combination with one another. The oxygen, though present in a much smaller proportion than the nitrogen, is nevertheless the active ingredient upon which the two most important properties of air depend—namely, its power of supporting combustion and respiration. The nitrogen acts simply as a diluent to moderate the too energetic effects of the oxygen. Analyses of the air have been made by many distinguished men of science since the time of Lavoisier, and these all tend to show that the composition of the air is constant, or very nearly constant. In spite of the millions of animals continually using up the oxygen, and the other numerous processes of oxidation, artificial and natural, going on from day to day, the air does not appear to vary by more than $\frac{1}{10}$ per cent. in the amount of oxygen it contains, a difference only to be detected by the most skilled experimenter. This constancy in the composition of the A. may be traced in part to the action of vegetable life on carbonic acid gas, in part to the enormous bulk of air surrounding the globe. For whereas animals in the act of respiration absorb oxygen, and return it to the air combined with carbon as carbonic acid, plants, on the other hand, absorb carbonic acid and abstract the carbon from it, thus leaving pure oxygen, which they return as such to the A. The amount of carbonic acid present in the air

in open country amounts on an average to 4 volumes in 1000. The ammonia, though playing an important part in vegetable existence, is present in the air in only minute quantity, varying from about 50 to 0.1 volumes in 1,000,000 of air.

Atmospheric Electricity. Since the time of Franklin, who showed the identity of lightning with electricity, there have been numerous observers in this department of electrical science; but it is only within recent years that the difficulty of making accurate quantitative measurements has been overcome by the construction of delicate and portable electrometers, for the vast improvement of which we are specially obliged to Sir William Thomson of Glasgow; and as yet sufficient observations have not been made, or sufficient facts established, to enable us to satisfactorily explain many curious phenomena traceable to the presence of electricity in the atmosphere.

In ordinary weather, the earth is negatively electrified, and the atmosphere positively electrified, with the exception of the first few feet, which are neutral. When the weather is wet and stormy, however, the electricity of the atmosphere becomes *negative*. The intensity is found to increase as the height increases, and is subject to diurnal and annual periodic fluctuations. In one day there are found to be two maxima and two minima—the maxima occurring a few hours after sunrise and sunset. This variation has been explained as due to the change in electrical conductivity of the lower strata of air produced by variation of temperature. The annual period is also double, the maxima occurring at midsummer and midwinter—the greater maximum at midwinter, which fact may be explained as being caused by the greater *humidity* of the air in winter than in summer. The direction of the wind has also a marked effect; thus, Sir W. Thomson could almost predict the occurrence of an E. wind by finding a particular high electrification.

As to the cause of A. E., there have been various theories advanced, all of which, however, require experimental proof. For instance, it has been suggested that evaporation may have produced this electric tension; chemical action has been urged as the cause; and, more recently thermo-electricity. Meanwhile, there can be little doubt that the friction occasioned by the currents of air has no slight effect.

Atmospheric Railway is a railway on which locomotion is effected by means of the pressure of the atmosphere. The first methods aimed at producing a difference of pressure on the two ends of a carriage fitted closely, but movably, into a long tunnel, either by forcing air in behind, or by exhausting it in front of the carriage. These were, however, unsuccessful, owing to the great waste of energy, and to the interference of travelling in a dark tunnel. About 1835, Henry Jenkins proposed and patented another plan of propulsion; and this method, with a few alterations, was for a time worked with a certain amount of success on the Kingstown and Dalkey line. The essential difference between this and the former methods was that the carriage was external to the tube, but was connected by a rod to a piston fitted air-tight into the tube, which piston was forced along by exhaustion of the air in front. The result showed, however, that, except in peculiar circumstances, the A. R. could not commercially compete with the ordinary locomotive.

Atoll, the Polynesian name for the perfect form of coral island, which consists of a more or less circular ring of coral, enclosing a lake termed an *A.* or *lagoon*, communicating with the outer sea by a break in the coral ring. According to Mr Darwin's theory of coral-reefs, the A. marks the complete subsidence of original land; the coral structures being built up around the land as it is depressed. Some atolls are of large size. Bow A. is 30 miles long by 6 broad; Rimsky, 54 miles long by 20 across; Suadiva A. is 44 miles in one diameter by 34 in another.

Atom (Gr. *atomos*, an indivisible particle; from *a*, negative, and *temno*, I cut). With regard to the ultimate state of matter, there have been two rival theories from a very early age—viz., first, that matter is indefinitely divisible; and second, that however much you may divide and subdivide any portion of matter, a stage is at last reached beyond which it is impossible to go: in other words, you have arrived at the small, hard, *indivisible* particles known as *atoms*, which constitute matter. The latter theory is that now generally accepted; and it is especially useful in the theoretical discussion of chemical compounds. There is

one difficulty, however, in the conception of such atoms; for their indivisibility presumably depends upon their hardness, which must of necessity be capable of resisting any force, i.e., must be infinite. To obviate this difficulty, Sir W. Thomson has brought forward his theory of vortex atoms. See **VORTEX**. This well-known physicist has also made an approximation to the size of atoms, which may be best conceived of from the following description: If a drop of water were magnified to the size of the earth, the atoms composing it would appear of a size somewhere between a small shot and a cricket-ball.

Atomic Theory. The A. T. teaches that all matter (that is to say, that which has weight) is composed of minute particles or *atoms*. All the atoms of the same *element* (or substance containing but one kind of matter) are of the same weight, and possess the same properties, but the atoms of different elements have different weights, and possess different properties. All matter is composed of the elements; and as up to the present time science has revealed only sixty-three of these, it follows that but sixty-three kinds of atoms are as yet known. *Compounds* are formed of atoms of different elements united together by the force called *affinity* or *chemical attraction*. The smallest particle of a compound obviously contains two or more atoms, and this smallest particle or complex of atoms is called the *molecule* of the compound in question. As, however, the smallest particle of an element that can exist in the uncombined or free condition often contains more than one atom, the term *molecule* is not restricted to compounds, but is employed generally to designate the smallest particle of any body which can exist in the free or uncombined condition.

Atoms are represented for the sake of brevity by *symbols*—usually the first letter or letters of the name of the element. Thus 'O' stands for an atom of oxygen, 'Sn' for an atom of tin (*Stannum*), 'Hg' for an atom of mercury (*Hydrargyrum*). In writing the formula of a molecule, the symbols of the element or elements composing it are placed side by side, and on the right hand, below each, a small figure is placed to indicate the number of atoms of the element in question contained in the molecule. Thus 'C₂' represents a molecule of oxygen, and shows that it contains two atoms of that element: 'H₂O', a molecule of water, containing two atoms of hydrogen and one atom of oxygen.

The atom of each element is characterised by its *weight* and power of combining with other atoms (*atomicity*). As to the *absolute* weight of any atom nothing whatever is known, but it has been found possible to determine the *relative* weights of the atoms of all the elements; and this is a point of fundamental importance in chemical science. The atom of hydrogen, on account of its extreme lightness, offers a convenient standard with which to compare the weights of the atoms of other elements; its weight is therefore taken as unity, and the weights of other atoms expressed in terms of it. The *atomic weight* of an element, then, is the weight of its atom compared with the weight of the atom of hydrogen. The atomic weight of oxygen, for instance, is 16; that is to say, the atom of oxygen is 16 times as heavy as the atom of hydrogen. See **ATOMIC WEIGHTS**. The A. T. well explains the laws of chemical combination (from which, indeed, it was first deduced, and established as a rational hypothesis).

The first of these is known as the *law of definite proportions*, and may be thus stated:—

The same compound, no matter what its origin, contains the same proportions of its constituents.

A quantity of any compound consists of a number of *molecules* characteristic of it, each of which contains the same *number* and *kind* of atoms. The sums of the weights of the different atoms in the molecule will necessarily also be the proportions in which the respective elements are present. Thus the compound water, no matter from what source (providing it be pure water), is found on analysis to contain 8 parts by weight of oxygen, and 1 part by weight of hydrogen, and these proportions never vary. It has been stated above, that the smallest particle of water capable of existing contains two atoms of hydrogen united to 1 atom of oxygen, and that the atom of oxygen weighs 16 times as much as the single atom of hydrogen; and thus it follows that oxygen and hydrogen are present in water in the proportions 16:2 or 8:1.

The second, or *law of multiple proportions*, teaches that—

When two bodies unite in more than one proportion, the quantities of each contained in the different compounds bear a simple relation to one another.

In any series of compounds containing the same elements, the difference between the members of the series is owing to the number of atoms the molecule of each contains, hence the proportions by weight in which each element is present will vary according to the number of the atoms contained in the molecules of the different compounds.

The subjoined table of the composition of the oxides of nitrogen will render the above explanation clear.

Oxides of Nitrogen.	Formula.	Composition.	
		Nitrogen : Oxygen.	
Nitrous oxide (laughing-gas), . . .	N ₂ O	28	16
Nitric oxide,	N ₂ O ₃	28	32
Nitrous anhydride,	N ₂ O ₅	28	48
Peroxide of nitrogen,	N ₂ O ₄	28	64
Nitric anhydride,	N ₂ O ₅	28	80

Atomic weight of nitrogen, 14
Atomic weight of oxygen, 16

The laws of *equivalent proportions* will be treated of in art. EQUIVALENT.

The belief that matter is composed of minute particles or atoms is a very ancient one, and appears to have had its origin in India or Persia. A very complete A. T. was taught by the Grecian philosopher Leucippus, and after him Democritus (460 B.C.); indeed it is surprising in how many respects the views of the latter philosopher coincide with those of the present time, although Democritus supported his theory on metaphysical argument only. It was reserved for John Dalton (1804-8) to establish the atomic hypothesis on a firm experimental basis, and to show that without its assistance the facts of chemical combination would be altogether inexplicable.

Atomic Weights The atomic weight of an element has been defined in art. ATOMIC THEORY; it remains to describe the methods by which these have been determined.

As all compounds are formed by the union of whole atoms of different elements, each atom possessing a definite weight; and as in the same compound the same number and kind of atoms are contained, it follows that the proportions by weight in which the elements combine together will be directly as their respective A. W., or as multiples of these; hence from the analysis of a series of compounds which an element forms, its atomic weight may be arrived at.

The atomic weight of mercury was deduced by Erdmann and Marchand from the analysis of the *red oxide of mercury*. In 118.3938 parts by weight of this compound, they found 109.6308 of mercury, and hence by subtraction 8.7630 of oxygen. Assuming the atomic weight of oxygen to be 16, the quantity of mercury combined with 16 parts of oxygen is arrived at by the proportion

$$8.763 : 109.6308 :: 16$$

which gives 200.2; and this number is considered to be the atomic weight of mercury, assuming that the red oxide of mercury contains a single atom of oxygen and mercury (HgO). But here arises a difficulty. There is a second compound of oxygen and mercury containing 400.4 parts of mercury combined with 16 parts of oxygen. Is the atomic weight of mercury 400.4, and the formula of the first oxide HgO₂, that of the second being HgO? or is it 200.2, and the formula of the two compounds HgO and Hg₂O respectively? This question cannot be answered by analysis, but fortunately a discovery made by two French physicists—Dulong and Petit—enables a decision to be made. These two observers, from a series of experiments, found that the amount of heat necessary to raise a given weight of an element through a certain interval of temperature—in other words, the *specific heat* of the element—is inversely proportional to its atomic weight, hence the product of specific heat and atomic weight is a constant number (6.4).

$$S \times A = C = 6.4$$

And by means of this law the atomic weight of an element may be deduced by dividing the number 6.4 by the specific heat of the element in question.

$$A = \frac{6.4}{S}$$

The atomic weight of mercury, as arrived at by this method, is 199.8, a number closely approximating 200.2.

Another important aid to the determination of A. W. is afforded by Gay Lussac's *Law of Atomic Volumes*, which may be thus stated: *The densities of all gases are proportional to their A. W.* If the weight of a volume of any gas be compared with the weight of the same volume of hydrogen (at the same temperature and pressure), the number expressing the relation between the weights of the two gases will be the atomic weight of the gas in question.

TABLE OF THE ELEMENTS WITH THEIR ATOMIC WEIGHTS.

Name.	Symbol	Atomic Weight.	Name.	Symbol	Atomic Weight.
Aluminum	Al	27.5	Molybdenum	Mo	96
Antimony	Sb	122	Nickel	Ni	59
Arsenic	As	75	Niobium	Nb	94
Barium	Ba	137	Nitrogen	N	14
Bismuth	Bi	210	Osmium	Os	199
Boron	B	10.9	Oxygen	O	16
Bromine	Br	80	Palladium	Pd	106.5
Cadmium	Cd	112	Phosphorus	P	31
Cæsium	Cs	133	Platinum	Pr	197.2
Calcium	Ca	40	Potassium	K	39.1
Carbon	C	12	Rhodium	Rh	104.3
Cerium	Ce	92	Ruodum	Ru	85.3
Chlorine	Cl	35.5	Ruthenium	Ru	104.3
Chromium	Cr	52.5	Selenium	Se	79.5
Cobalt	Co	59	Silicon	Si	28
Copper	Cu	63.5	Silver	Ag	108
Dicymium	Di	66	Sodium	Na	23
Erbium	Er	112.6	Strontium	St	87.5
Fluorine	F	19	Sulphur	S	32
Gold	G	196.6	Tantalum	Ta	182
Hydrogen	H	1	Tellurium	Te	128
Iodine	I	127	Thallium	Tl	204
Iridium	Ir	197.1	Thorium	Th	232
Iron	Fe	56	Tin	Sn	118
Lanthanum	La	92	Titanium	Ti	50
Lead	Pb	207	Tungsten	W	184
Lithium	Li	7	Uranium	U	240
Magnesium	Mg	24.3	Vanadium	V	51.3
Manganese	Mn	55	Yttrium	Y	61.7
Mercury	Hg	200	Zinc	Zn	65
			Zirconium	Zr	89.5

Atone'ment, as used in the Bible, means, in the Old Testament, the reconciliation of God to men, when alienated from them by sin, by means of sacrifices; in the New Testament, simply reconciliation. A consciousness of guilt in relation to a divine being, accompanied with the belief that it could be condoned by sacrifices, seems to have been a universal sentiment in human experience. The finest of certain animals were offered in this way, and, when the sacrifice required to be peculiarly precious, even human beings. Dr Magee, in his learned work on *Sacrifice*, has adduced abundant proof of the fact that human sacrifices have been offered by every nation of the known world *except the Jews*, and perhaps he need not have made even that exception. An elaborate system of sacrifice was, at any rate, in vogue among the ancient Israelites, and continued among the Jews until the time of Christ. It is generally believed by those who hold what is known as the unity of the Old and New Testaments, that these sacrifices were typical of the A. of Christ, so that the great central truth of Revelation, 'without shedding of blood is no remission,' was set forth in the Old as well as the New Testament. According to this view, all the Old Testament sacrifices had relation to a covenant between God and man; the sin-offering implied that that covenant had been broken, but might be knit together again through the shedding of blood; or that, because the wages of sin is death, an A. was made for the sin that existed in man by the vicarious suffering of an appointed victim. All this sacrificial phraseology is distinctly applied in the New Testament, especially in the Epistle to the Hebrews, to Christ, who united in his own person the office of priest, offerer, and sacrificer, and made an A. which is at the same time the vicarious sacrifice rendered necessary by the sin of man, and also the completion of that perfect obedience to the will of God which is the natural duty of sinless men. In order to give an intelligible account of the subsequent development of the doctrine of the A., it will be necessary to make a classification of the different opinions that have prevailed regarding it. The most important of these may be included in one or other of the following five classes:—

1. It will be most convenient to start with the orthodox theory, which, in its essential features, is common to the Roman Catholic, Lutheran, and Reformed Churches. This theory was developed by Anselm (11th c.), on the foundation of the Augustinian theology. See AUGUSTINE. The propositions laid down in his famous book *Cur Deus Homo* are—(1.) That it is necessary that man should be redeemed. (2.) That this redemption cannot be made without satisfaction. (3.) That satisfaction can be made only by a God-man. (4.) That it is in fact accomplished in Christ's passion. His argument is founded on the assumption that the pardon of sin requires a satisfaction of infinite merit, which can only be rendered by a person of infinite dignity. According to this theory, which has been more fully developed since the time of Anselm, 'the work of Christ is a real satisfaction, of infinite inherent merit, to the vindicatory justice of God; so that he saves his people by doing for them what they were unable to do for themselves, satisfying the demands of the law in their behalf, and bearing its penalty in their stead; whereby they are reconciled to God.'

2. Another theory of the A., which was held by many of the early fathers (including Augustine and Jerome), regarded the work of Christ solely as a deliverance of man from Satan, into whose power he had fallen through sin. Under this general theory three different phases prevailed. (1.) Satan was regarded as the owner of man, by conquest in Adam. To deliver man from this bondage Christ offered himself as a ransom to Satan, which was accepted; and then Satan, having no power over a sinless being, found that he could not keep his ransom. (2.) As Satan had conquered man, so Christ was regarded as having conquered him, and thus acquired the right to set free his victims and consign himself to chains. (3.) A third form of the theory was, that as Satan's right over man was founded on sin, he exceeded his authority when he brought about the death of Christ, and so forfeited his authority over mankind.

3. A third (the Moral) theory rejects all idea of expiation, or satisfaction of justice by vicarious punishment, and attributes all the efficacy of Christ's work to the moral effect produced by his character, teaching, and acts. Different theories of the A. are associated with certain well-known names—e.g., F. D. Maurice, F. W. Robertson, Professor Jowett, J. M'Leod Campbell, Dr John Young, Dr Bushnell, &c.—all of which, as well as the Socinian, are referable to this third class, and perhaps some of them partly to the next two. An analysis of each of these, however, cannot here be given; it must suffice to notice three different phases of the theory. (1.) The work of Christ as a redeemer is confined to his office of teacher. He introduced a new and higher form of religion, by which men were redeemed from the darkness and degradation of the service of sin. (2.) The real benefit conferred by Christ was in his doctrine; but by his death his doctrine was sealed with blood. He saves us as a martyr. (3.) The power of Christ for our redemption was due to the manifestation he made of self-sacrificing love. As no such instance of it as that of Christ had ever occurred before or could occur again, he is the Saviour by pre-eminence.

4. What may be called the Governmental theory was first developed by Grotius (17th c.), in opposition to the Socinians. The main idea of it was adopted by some of the Arminians, and has been reproduced by many modern writers both in Germany and America. Its principal features are as follows: (1.) In the forgiveness of sin God is not to be regarded as an offended party, a creditor, or a master, but as a moral governor. (2.) The end of punishment is the prevention of crime and the promotion of the best interests of the community. (3.) As a good governor cannot allow sin to be committed with impunity, God cannot pardon sin without an adequate exhibition of his displeasure; he therefore punished sin in Christ as an example.

5. The last theory (the Mystical) regards the effect of Christ's work as produced upon the sinner, and accomplished by the mysterious union of the divine and human natures brought about by the incarnation. (1.) Among some of the early fathers there was an obscure notion that in some way the coming of Christ had reversed the effect of the Fall, and produced a physical effect upon our race to render it immortal. (2.) By the Platonists, however, the mysterious operation of the incarnation was connected with their doctrine of the Logos. The Logos being one with God, and also with the inner life of the world (including man), these two were made one by the incarnation. This theory was developed by Erigena (9th c.) and other writers during the middle

ages, and the ideas and language connected with it are found to a considerable extent in the writings of the Reformers. See Anselm's *Cur Deus Homo*, Calvin's *Institutes*, Baur's *Christliche Lehre von der Versöhnung*, Neander's *Christliche Dogmengeschichte*, Gieseler's *Lehrbuch der Dogmengeschichte*, Maurice's *Theological Essays*, M'Leod Campbell's *Nature of the A.*, Crawford's *Doctrine of Holy Scripture respecting the A.* (2d ed. 1874), and Hodge's *Systematic Theology* (1873).

Atra'to, a river of the United States of Colombia, S. America, rises in the W. Cordilleras of the Andes, about 30 miles from the Pacific, flows N. with an average fall of 3 inches to a mile, and after a course of 250 miles, enters the Gulf of Darien by nine mouths. It is navigable for 140 miles, and a scheme for connecting it with the Pacific by means of a canal is said to be feasible.

At'ri, the *Atria* or *Adria Picena* of the Romans, is an episcopal town in the province of Teramo, S. Italy, 14 miles S.E. of Teramo, with numerous remains of antiquity, walls, mosaic pavements, &c. Its ancient coins are among the heaviest known. There are some excavated chambers in a neighbouring hill, of perfectly regular form, and evidently of ancient date, the purpose of which has not been ascertained. Pop. 3632.

At'riplex, a genus of Dicotyledonous plants belonging to the order *Chenopodiaceæ* (q. v.).

A'trium, the name applied to the entrance-hall of Roman mansions, and in zoology to the sac or chamber in the Tunicate mollusca, or 'sea-squirts,' into which the effete water of respiration is sent, to be thence ejected from the body. The intestine also opens into the atrial chamber, which in turn communicates with the exterior by a definite aperture—the atrial orifice. See ASCIDIAN, MOLLUSCA, and TUNICATA.

At'ropa, a genus of plants belonging to the order *Solanaceæ* (q. v.), sub-order *Atropaceæ*. See BELLADONNA.

At'rophy is a term used in pathology to denote wasting of a part of the body. It may be either general or partial, and it may occur from simple diminution in size of the organ or tissue without organic change, or it may be associated with fatty or other degeneration or infiltration. General A. occurs, for example, in old age; simple A. may be seen in the wasting of any special organ from a deficient supply of blood or of nervous energy; and A. with degeneration is seen in the case of a fatty heart, in which, in addition to wasting, the fibres are found to contain numerous fatty molecules. The causes of A. are—(1) a deficient supply of blood; (2) a deficient quality of blood; and (3) a deficient action of the nervous system. If we partially cut off the supply of blood to a limb, or sever the nerve distributed to its various parts, it quickly undergoes A. Disease of the nerve centres may also cause A. The antithesis of A. is hypertrophy.

Atro'pia, or **Atropine**, is an alkaloid contained in the different parts of *Atropa Belladonna* and *Datura Stramonium*. It is a white crystalline substance, of bitter and unpleasant taste, and has the chemical composition represented by the formula $C_{17}H_{23}NO_3$. It is an exceedingly poisonous substance, but is given in medicine in small doses. It has the peculiar property of dilating the pupil of the eye when its tincture is applied as a lotion.

Atrow'li, or **Attrow'lee**, a town of British India, in the N.W. Provinces, executive district of Allypore, 63 miles N.N.E. of Agra, with a copious water supply and good bazaar. Pop. (1872) 15,052.

At'taché (Fr.) is the name given to a young diplomatist who accompanies an embassy to assist his superior and obtain a knowledge of political business.

Attachment is an English law term for the judicial procedure corresponding to that which in Scotland is called Arrestment (q. v.). By means of it a creditor may obtain the security of the personal property of his debtor in the hands of a third person, for the purpose, in the first instance, of enforcing the appearance of the debtor to answer to an action, and secondly, upon his continued default, of obtaining the property absolutely in satisfaction of the demand.

An A. is also sometimes issued by order of the judges of a court of record against a person for 'Contempt' (q. v.). The offender is committed without appeal, indictment, or information; for though, under Magna Charta, no one can be imprisoned without

the judgment of his peers or the law of the land, yet this summary proceeding is considered necessary for the due administration of justice, and is now confirmed as the law of the land.

Attack, in military language, signifies an advance on the part of an organised force, with the view of dislodging the enemy from his position, either in the open country or in a fortress. The A. may be conducted by cavalry or by infantry, but in either case there should always be a reserve of infantry and artillery to follow up the A. if successful, or to cover the retreat of the attacking body if repulsed. As a rule, the A. is made upon one or other of the flanks, which are generally the weakest portions of the enemy's line; but the first Napoleon preferred to direct one strong A. upon the central column. In usual circumstances, attacks and assaults are best conducted at early dawn; but unless the attacking party be well acquainted with the surrounding country, a night A. is seldom to be recommended. The artillery generally does effective service before the A. proper has begun, thus paving the way, so to speak, for the infantry and cavalry, by creating confusion to a certain extent in the enemy's ranks.

Attainder is the degradation and loss of civil rights which attached to a person, and to his descendants, when adjudged guilty of treason or felony. It is of feudal origin, and under it the convict could have no heir, his estate falling to the crown. Nor could he succeed to any ancestor. These absurd penalties, by which many innocent persons were made to suffer for the crime of one guilty one, have now been mitigated, so as to bring them into harmony with the civilisation of our own time. Now, even in cases of treason and murder, no penalty is inflicted upon the family or heirs of the convict. He may be condemned to pay the costs incurred in procuring his conviction. During imprisonment—if imprisonment be involved in the sentence—he cannot sue. Administrators are appointed to take charge of his property. Out of it they are allowed to give compensation for any loss or damage occasioned to another by the crime or fraud of the convict. They may also make a provision for the support of his family. When the prisoner is liberated, the administrators must account to him, and pay over to him any balance of his property remaining in their hands. Any property which falls to a convict during the period of the sentence, is held to vest in himself, and not in the administrators.

In Scotch law, the word A. is only applied to the penalty of treason; but in this case, and under the term generally, as applied in English law, the penalties for A. in Scotland are nearly the same as in England.

Attainder, Bill of. See BILL OF ATTAINDER.

Attaint, Writ of, a procedure in English law by which the plea is urged of already A. In Scotch law, A., or 'attaynt,' means simply 'convicted.'

Attalea, a genus of palms found in S. America. The most of the species have lofty stems. From the leaf-stalks of *A. funifera* a valuable fibre is obtained in Brazil, called *Passaba* (q. v.), and used for ropes, brooms, &c. Another fibre of the same name is got from a different palm, called *Leopoldinia Passaba*, which is largely imported into Britain from Brazil. What are known as Coquilla nuts are the hard brown seeds of *A. funifera*, and are used in this country for making umbrella handles, &c. The fruit of *A. compta*, the Pindova palm of Brazil, is edible, and much esteemed. A valuable oil is obtained from what are called Cahoun nuts, the produce of *A. Cohune*. Indiarubber, which is formed of the juice of *Siphonica elastica*, is generally dried by means of burning the nuts of *A. excelsa* and other species.

Attar or Otto of Roses. See PERFUMES and ROSE.

Atterbury, Francis, Bishop of Rochester, was a son of the Rev. Dr Lewis A., rector of Milton Keynes, Bucks, and was born at the rectory 6th March 1662. He was educated at Westminster School and Christ Church, Oxford, and came to London in 1691, where his eloquence brought him into notice. He became chaplain to William and Mary, lecturer of St Bride's, and preacher at the Bridewell Chapel. A staunch churchman, he distinguished himself (1700) in a controversy with Dr Wake, as the champion of ecclesiastical against civil authority, especially maintaining the authority of convocations. The House of Convocation was not slow in showing its gratitude. The degree of D.D.

was conferred on him, with the thanks of the House. In 1704 he was made Dean of Carlisle, in 1707 a Canon of Exeter, in 1712 Dean of Christ Church, and in 1713 Bishop of Rochester and Dean of Westminster. But the tide of fortune turned on the death of Queen Anne in the following year. He refused to sign the bishops' declaration of fidelity to George I., which brought upon him the dislike of that monarch and the suspicion of the government. In 1722 his complicity in Jacobite plots threw him into the power of his enemies. He was committed to the Tower on a charge of treason. On this he was found guilty. He was sentenced to deprivation of all his ecclesiastical offices, declared incapable of holding any civil or ecclesiastical office in the king's dominions, and condemned to perpetual banishment. He left the country in June 1723, settling shortly afterwards in Paris, where he died 15th February 1732. The interest which the life of A. has in our day, and his reputation as a writer, are from his letters to Pope, Swift, and other celebrated men of his own time. These show him to have been a man of native wit and ability, and of cultivated literary power. In his lifetime, however, it was his controversial writings, his rhetorical power, and his practical energy to which he was indebted for his intellectual reputation, and for his worldly success. His elder brother, Lewis A., I.L.D., also became a clergyman, and held latterly the rectories of Shepperton and Hornsey, in Middlesex. He died 20th October 1731. Some volumes of his sermons and tracts are in print. The school for girls at Newport Pagnell was endowed by him.

Attestation is in English law the verification of deeds and bills by witnesses. The clause at the end of the instrument is called the A. clause. In Scotland it is called the Testing Clause (q. v.).

Attic is the name given in architecture to a low storey rising above the entablature, or a cornice which marks the height of the principal part of a building. According to Professor Goldstücker (*Transactions of the Philological Society*, 1854), the word is from the Sansk. *attaka*, a room on the top of a house, which corresponds pretty closely with its ordinary application, viz., to denote a skylighted room in the roof of a house.

Attica, a political division of Greece, was of triangular shape, and was bounded on the E. by the Ægean, on the W. by Megaris and the Saronic Gulf, and on the N. by Bœotia. It is distributed into the following natural divisions: The Eleusinian plain; the Athenian plain; the highlands; the midland district; and the sea-coast district. The principal hills are Cithæron, Parnes, Hymettus, famous for its bees and honey, Pentelicus for its marble, and Laurium for its silver mines. The principal streams are the Cephissus and the Ilissus, which water the Athenian plain. The soil was well suited for the growth of fruits, of which the olive and the fig were most abundant. From the earliest times the people of A. were divided into four *phyle* or tribes. Tradition ascribed to Cecrops the distribution of the country into twelve communities, and to Theseus their consolidation under one government. The old tribes were gradually increased to thirteen, and each tribe was subdivided into *demi* or townships, the number of which is supposed to have been about 170. A. became a Roman province under Vespasian. In 396 A.D. it was overrun by Alaric, king of the Goths. At the present day, along with Bœotia, it forms a nomarchy of the kingdom of Greece.

Atticism (Gr. *attikismos*). Among all the Greek dialects, the Attic was the most finely developed, and as an instrument for the expression of poetic and philosophic thought, was most widely spread in Greece. After the rise of the Macedonian power, it became the language of literature and politics over the greater part of the known world, but its very extension exposed it to the corruption of foreign influences, and it soon began to lose its purity. Against this evil the grammarians strove hard, and sought by every means in their power to preserve the pure Attic of earlier times. This was the A. of the ancients, and those who distinguished themselves by the purity of their Attic style were Atticists. The term is now used to denote any refined and concise mode of expression.

Atticus, Titus Pomponius, born at Rome B.C. 109, of an old equestrian family, the school-fellow, friend, and correspondent of Cicero. On the breaking out of the first civil war,

he withdrew to Athens, B.C. 85, ostensibly to prosecute his studies, but really to keep himself free from political complications, but returned to Rome B.C. 65, at the request of Sulla. He was intimate with the chiefs of all parties, to whom he gave wholesome advice. He inherited great wealth both from his father and his uncle, and this he increased by judgment and enterprise as a mercantile speculator. His taste was exquisite, and authors eagerly solicited his criticism. Nepos composed a life of A., and from Cicero's *Epistles to A.* we gather additional details. A. was profoundly versed both in Greek and Roman literature. He starved himself to death, B.C. 32, when he found that he was labouring under an incurable illness. None of his writings have been preserved, but his *Annales*, an epitome of Roman history from the earliest times to his own day, and rich in genealogical lore, was highly valued by his contemporaries.

Attila (the name is a Latinised form of the Tartar *Atalik*, father-like; to this day a title among the Usbeks of Bo'hara), king of the Huns, son of Mundzuk, a scion of the royal stock of the Huns, in A.D. 434 succeeded to the sovereignty of the innumerable Turanian hordes between the Carpathians and China, and had under him an army of at least half a million of barbarians, who believed him invincible as the possessor of the sword of the Scythian god of war. The career of one who boasted that no grass grew where the hoof of his horse had trod sufficiently explains how he came to be regarded with an awe that found expression in the title of 'the Scourge of God,' first applied to A., and afterwards to the whole race of the Huns. In 447 he ravaged that portion of the Eastern empire lying between the Euxine and the Adriatic, defeating in three sanguinary engagements the forces of Theodosius II., who, after forming a treacherous design against his life, had to cede to him a large territory S. of the Danube, and an annual tribute. A. next attacked the Western Empire, allying with himself the Vandals and Franks. He crossed the Rhine at Strasburg, and marched on Orleans; but the arrival of Aëtius compelled him to retire to the plain near which Chalons-sur-Marne now stands, where he was defeated with immense slaughter, not fewer than 250,000 to 300,000 having been left on the field. Next year, having recruited his forces, he crossed the Alps, took and destroyed Aquileia, and ravaged the whole of Lombardy. He now prepared to march on Rome, which was saved by the mediation of Leo the Great, whose majestic mien awed the savage into clemency. Then he retired to his palace beyond the Danube, and on the night of his marriage to a beautiful maiden named Iilda or Ildiko, died by the bursting of a blood-vessel, A.D. 454. A. was short of stature, dark complexioned, large headed, with a stately gait, and small, quick, brilliant eyes. The circumstances of the times made his barbaric expeditions peculiarly formidable to Western civilisation, but on his death his enormous empire fell to pieces as rapidly as it had risen, though saga and song long preserved among the Germanic people the memory of the mighty monarch. See Klemm, *A. nach der Geschichte, Sage und Legende* (Leipz. 1871); Therry, *A. dans les Gaules* (Par. 1852); and Ilagge, *Geschichte A.'s* (Celle, 1862).

Att'ock, a town and fort of the Punjab, on the Indus, where it becomes navigable for steamboats, 450 miles from its mouth. It was built by the Emperor Akbar in 1581, near the supposed site of the ancient *Taxila*, where in 326 B.C. Alexander the Great crossed the Indus. About two miles above A. the Indus is joined by the Cabul river, the valley of which forms the great commercial highway of Central Asia. Pop. (1878) 1454.

Attorney, in its general meaning, signifies one appointed by another to act for him.

Attorney, Letter or Power of. This is a deed requiring legal execution and stamp. It may be either general or special. In the first case, it empowers the agent of the grantor to transact his entire business during absence; in the second case, the power of the agent is specifically restricted. The deed, until revoked, gives the agent the full power of his constituent.

Attorney, Warrant of (English law term). This instrument is sometimes inchoitously given by debtors who are pressed by their creditors. A W. of A., as well as a *cognovit*, authorises the creditor to enter judgment and levy execution, either in-

stantly or within a certain time specified in the deed. The grantor is liable, when the judgment comes into operation, at any moment to have all his property taken from him and sold at a ruinous price. Moreover, the warrant or *cognovit* must be filed in a public office within twenty-one days from its date; and this being done, credit is thereby completely ruined. The Debtors Act of 1869 gives some protection to the unwary. It provides that no W. of A. or *cognovit* shall be effective unless the attorney of the grantor be present to inform him of the nature and effect of the deed before execution, which attorney is to subscribe his name as a witness to the execution. A W. of A. is also void against creditors unless filed in the Queen's Bench.

Attorney-General, the title of the first law officer of the crown in England and Ireland. To some extent the powers and duties are the same as those of the Lord Advocate (q. v.) of Scotland; but those of the latter are relatively to Scotland greater. The duty of the A. may be broadly stated to be to advise and protect the crown and state; hence he conducts prosecutions relating to revenue, files informations for wrongs committed on the property of the crown, and guards the legal interests of charitable endowments, the crown being of these the legal guardian. All crimes which tend to affect the peace of the state fall under the cognisance of the A. In his absence, his duties are discharged by the Solicitor-General (q. v.). Both officers are members of the government, and on a change of ministry their tenure of office ceases.

Attorneys and Solicitors are persons duly admitted to the Queen's courts, where they act for their clients. Being considered as public officers belonging to the courts, while allowed certain privileges, they are under the summary jurisdiction of the judges in everything connected with their profession. The functions of an attorney and of a solicitor are exactly the same. The practitioner in the courts of common law is called an attorney; the practitioner in the courts of Chancery is called a solicitor. In the transaction of business out of court, solicitor is the word used.

For permission to practise as attorney or solicitor, it is generally necessary to be bound and duly serve under articles of clerkship to a practising attorney or solicitor for three years, and to pass an examination; also to have the degree of Bachelor of Arts or of Bachelor of Laws in the University of Oxford, Cambridge, Dublin, Durham, or London, or in the Queen's University in Ireland; or the degree of Bachelor of Arts, Bachelor of Laws, or Doctor of Laws, in a university of Scotland. A barrister may plead in a county court without previously receiving his instructions from an attorney or solicitor. In Ireland the position of attorney and solicitor is almost exactly the same as in England. In Scotland the corresponding professional classes are called Writers to the Signet (see WRITER TO THE SIGNET) and Solicitors before the Supreme Courts (see SOLICITOR BEFORE THE SUPREME COURTS). The relations of these bodies to one another, and the law generally respecting law agents, has been considerably altered by the Law Agents (Scotland) Act of 1873.

Attraction is a general name for any force which draws or tends to draw different portions of matter together. Gravitation is a case in point, as also cohesion, adhesion, chemical affinity, electric and magnetic attractions. Cohesion, adhesion, and chemical affinity are called *molecular* forces, because they are sensible only at insensible distances.

Attribute, in logic, is a term used to denote a property or quality of a substance. It is by means of attributes alone that we can conceive substances, yet they are not to be considered the substances themselves. They inhere in substances, and have no true existence as entities apart from them. Thus 'omnipotence' and 'omniscience' are attributes of God, but they are not God himself. Similarly whiteness is an A. of snow, and redness of blood.

Att'wood's Machine, a machine devised by Attwood for testing experimentally the laws of motion, by reducing the velocity of a falling body so as to give time to investigate the motion. Two equal weights are attached to the ends of a fine silk cord, which passes over a pulley whose axis turns on friction wheels. In this position the apparatus will evidently be in equilibrium. A third weight (very small in comparison to the other two) is then

added at one end, which immediately begins to descend. Now the only force which acts upon the three weights is the force of gravity due to the smaller weight. Hence, if m represent either of the equal weights, n the small weight, f the force which acts upon the three weights, and g the force of gravity, we have the equation

$$f(2m + n) = gm \text{ or } f = g \frac{1}{1 + \frac{2m}{n}}$$

where $\frac{2m}{n}$ may be made as large as we please, by making n small enough, so that the proportion of f to g may be made as small as we choose, and thus the velocity reduced as much as may be required. By this means we establish experimentally the law that the spaces described are proportional to the squares of the times. If we allow the heavier end to pass through a ring of such size as to lift off the smaller weight, we produce uniform motion; for there being now no force acting, the body will proceed only by reason of the velocity impressed upon it at the moment of change. Practically, a clock beating seconds, and a scale for measuring the spaces described, are attached to the apparatus.

Atwisha, an Indian poison, supposed to be obtained from a species of aconite.

Aubagne (anc. *Albania*, the capital of the Albigii), a town of the department of Bouches-du-Rhône, France, 9 miles E. of Marseille. A. has a church founded in 1164, and manufactures of tiles, pottery, and paper, and some distilleries and tanneries. Pop. (1872) 4903.

Aube, a department in the N.E. of France, lies in the basin of the Seine on the S.W., and of the river A. on the N.E., and consists of the S. portion of the old province of Champagne and a small part of Burgundy. Area, 2351 sq. miles; pop. (1872) 255,687. A. is mostly arable; in the S.E. abounds in rich meadow-land; and yields grain, hemp, rape, hay, wine, and timber. The chief manufactures are woollens, cotton and linen goods, ribbons, leather, porcelain, and paper; there are also large distilleries, beetroot-sugar factories, and bleaching-fields. The bacon and sausages of A. are *spécialités*. Troyes (q. v.) is the chief town. The river A. rises near Pralay, in the department of Haute-Marne, flows N.W., and joins the Seine, after a course of 90 miles.

Aubenas, a town in the department of Ardèche, France, on the right bank of the Ardèche, 14 miles S.W. of Privas, with some cotton, silk, paper, and leather manufactures. It has a ruined castle, and is partly encircled by an old wall. Pop. (1872) 4647. About 4½ miles N.W. of A. is the village of Vals, noted for its mineral springs. In the neighbourhood is the famous 'Ravine of Hell,' with a waterfall of 500 feet.

Au'ber, Daniel François Esprit, a facile, graceful, and frequently original musical composer, chiefly of opera-comique, born at Caen, Normandy, 29th June 1784, was the son of a Paris printseller, and was sent at the age of twenty to acquire knowledge of business in London. In youth he had attained proficiency in several instruments, including the piano, and while in England he devoted himself most assiduously to the study of music. Returning to Paris, he wrote several *concertos pour basse*, and published them under the name of the celebrated violoncellist Lamare. After several unsuccessful operas, his three-act opera, *La Bergère Châtelaine* (1820) was the first of a long and brilliant series of triumphs. By far the best known of his works in England are *Fra Diavolo* (1830) and *Les Diamants de la Couronne* (1841). His later style was much influenced by that of Rossini, but in many respects he was not inferior to the Italian *maestro*, and he is often spoken of as the Rossini of France. His *Amour sacré de la Patrie* became a second *Marseillaise*, and sung by Nourrit, it was the signal of revolution at Brussels on the 25th August 1830. A. died 14th May 1871.

Aubign'e, Merle d'. See MERLE D'AUBIGNÉ.

Aubigne, Théodore Agrippa d', a Huguenot historian and poet, born 8th February 1550, at Saint-Maur, near Pons, in Saintonge. Adopting the military profession, he rendered good service to the Protestant cause in 1567, for which he was made vice-admiral of Guienne and Bretagne by Henri IV., after

whose death he retired to Geneva, where he devoted himself to study till his death, April 29, 1630. His chief works are, *Histoire Universelle*, from 1550 to 1601 (Amst. 1616-20); *Histoire Secrète de Théodore Agrippa d'Aubigné, écrite par lui-même*, which first appeared in Cologne in 1721; and *Les Aventures du Baron de Féneste* (Gen. 1630). The two last are singularly pungent, and full of that epigrammatic virulence which marked the man, and cost him the favour of a prince who knew his sterling worth. See Sayon's *Vie de D'Aubigné* (Gen. 1841).

Au'bry de Montdidier, a French knight, according to tradition assassinated in 1371 by Richard de Maccuire, as was discovered by the implacable enmity displayed against the murderer by A.'s dog. Charles V. hearing of this, compelled Maccuire to fight the dog, which dragged him down, upon which he confessed his crime. The story became the subject of many ballads, and finally under different names took dramatic shape both in France and Germany. No melodrama was ever more popular in Paris or Vienna than the *Dog of Montargis* or the *Forest of Bondy*.

Au'bun, the name of numerous towns in the United States of America, the best known and most important of which is A., in the state of New York, 174 miles W. of Albany, on the outlet of Lake Owasco. Pop. (1871) 17,225. A. has manufactures of wool, cotton, iron, &c., besides numerous mills. The state prison at A. is conducted on the principle of isolating the convicts during the night, but of employing them in joint labour during the day. The proceeds of their labour is said to defray the expenses of the institution.

Aubus'son, a town of the department of Creuse, France, 125 miles W. of Lyon, noted for the manufacture of carpets, the most famous in France after those of the Gobelins and Beauvais. A. has also tanneries and dye-works, and a trade in wine. Pop. (1872) 5890.

Aubusson, Pierre d', grand-master of the order of St John of Jerusalem, born in 1423, was the fourth son of Renaud d'A., and belonged to the old French family of the Vicomtes de la Marche, the narrative of his biographer, Father Bonhours, being for this period almost destitute of dates and authorities, and frequently contradictory. He was one of the young seigneurs who accompanied the Dauphin in his expedition against the Swiss in 1444, and helped to win the battle fought near Basel; but soon after, when peace was concluded between France and England, he betook himself to the East. From this point his history is clear, and abundantly authenticated. At Rhodes he became a knight of the Christian brotherhood, obtaining the approbation of the successive grand-masters, Jean de Lastic and Jacques de Milly, by the punishment which he inflicted on the pirates of the Greek islands. In 1458 he was sent by De Milly to the French king to stir up his zeal as a Christian prince against the growing power of the Turks, and succeeded in effecting a league between Charles VII. of France and Ladislaus II. against Mohammed II. In 1461 we find A. castellan of Rhodes, procureur of the grand-master, and military commander of the order in his absence. In 1467 he was present at the chapter-general of the order held at Rome, and signalled himself by his wisdom, tact, and eloquence. Elected grand-master in 1476, at a moment when Mohammed II., irresistible in the East, was threatening the independence of Latin Christendom, A. showed undaunted courage and incomparable skill in the presence of his formidable adversary. In 1480 he repulsed 100,000 Turks with enormous loss in an attack on the island. A second expedition which Mohammed planned was put an end to by his death in May 1481. For some time after this A. devoted himself to the improvement of the internal organisation of the brotherhood, in which endeavour he won the respect and admiration of Christendom. In 1501 he was appointed to command the forces of the German emperor and his allies against the Turks. He attacked Mitylene, but through internal dissension the allies were baffled. A. died at Rhodes in 1503, aged eighty. The age cannot show a more chivalrous Christian warrior and sage than A. See Bonhours' *L'Histoire de Pierre d'A.* (Par. 1676, new ed. Par. 1806.)

Auch (the *Climbernum* or *Elinberis* of the Gauls), the capital of the department of Gers, France, on the river Gers, 42 miles W. of Toulouse, with woollen, cotton, and leather manufactures, and some trade in wine and brandy. It is the seat of an arch-

bishop, and has a splendid cathedral, founded in 1489. In the time of Cæsar it was the chief town of the *Ausci*, hence its name; then of Roman Aquitania; and in later times it was the capital of Gascony and of the county of Armagnac. Pop. (1872) 9414.

Auque'nia, a genus of Ruminant mammalia, represented by the llamas and alpacas of S. America, which are included in the *Camelidae* or Camel family. The llamas, however, do not possess humps, and the two toes of each foot are free, and each toe possesses a strong curved nail. The neck is elongated. The head is small. The upper lip is deeply cleft and mobile. Four kinds are known, but it is doubtful if more than two of these are distinct species. See LLAMA and CAMEL.

Auchterarder (Gael. 'the upper high land'), a town in the S.E. of Perthshire, 12 miles S.W. of Perth, on the Scottish Central Railway. Its chief industry is cotton-weaving. In 1839 the parishioners of A., by resisting the presentee of Lord Kinnoul, began the contest which ended in the formation of the Free Church. Pop. (1871) 3795.

Auckland, capital of the province of the same name, New Zealand, founded in 1840. Pop. (1870) about 12,000. Till the transference of the seat of government to Wellington, it was the capital of New Zealand. It possesses two harbours, 6 miles apart, and many substantial public buildings. It is well situated for commerce, and has a remarkably mild and equable temperature.—**A.**, the most northerly province of New Zealand, 400 miles long; greatest breadth, 200 miles; pop. (1871) 62,335. Its mineral treasures are valuable, comprising coal, iron, &c. It also produces much wool, and heavy grain crops.

Auckland, Bishop, a town in Durham, on the Wear, 10 miles W.S.W. of Durham, containing the palace of the Bishop of Durham. It is situated in the S. Durham coal field. Pop. (1871) 8736.

Auckland Islands, a group of islands S. of New Zealand, with some good harbours, which make them a valuable station for the whale fisheries of the Southern Pacific. Lat. 50° 48' S., long. 166° 42' E. They are almost uninhabited.

Auckland, William Eden, Lord, third son of Sir Robert Eden, Bart. of West Auckland, diplomatist and statesman, was born in 1744, called to the bar in 1768, became Under-Secretary of State in 1772, M.P. for Woodstock in 1774, and a Lord of Trade in 1776. In 1778 he was appointed one of the commissioners to treat with the insurgent colonists of N. America; held the office of Chief Secretary for Ireland, 1780–82; concluded a commercial treaty with France, September 1786; was ambassador to Spain, 1788, and to Holland, 1790. In 1793 he was made a British peer. He died 28th May 1814. A., who was a vigorous supporter of Pitt, wrote several political pamphlets, not without influence in their day.

Auckland, George Eden, Earl of, second son of the foregoing, was born August 25, 1784. In July 1834 he became First Lord of the Admiralty in the Cabinet of Earl Grey. From 1835 to 1841 he was Governor-General of India, and nearly the whole of his administration was occupied with the deplorable Afghan war. One gleam of light, however, is shed across the gloom. It was during A.'s rule that the British government ceased that connection with the native worship of Hindustan which affronted Christianity, and did not honour Brahminism. A. was recalled in 1841, and died at the Grange, near Alresford, 1st January 1849.

Auction, or **Roup**, is a mode of selling property by a competition of bidders, under certain conditions. These conditions are partly implied under common law, and are so far applicable to all sales by A. Such as, that no attempt be made to raise the price by fictitious offers, and that no attempt be made to keep it down by combination of the bidders. Besides these general conditions, an A. has generally its special conditions. These are written and exhibited or read over before the sale begins, and they are binding both on the seller and on the purchaser. This contract is in England called 'Conditions of Sale;' in Scotland, 'Articles of Roup.' There are many points of law respecting A. over which there is a good deal of obscurity. Thus there are doubts as to whether or not an exposé may bid

on his own account, or engage some one to bid for him. Sale announced as 'without reserve' is, however, certainly held to render his doing so illegal. What is called 'puffing' at an A. may vitiate a sale; that is, where the owner of the subject for sale raises the price by means of bidders acting for himself. The law regarding puffing is, however, very obscure. See PUFFING AT AUCTIONS.

Auctioneer, one who conducts an auction. He may act as agent, if he act in good faith, for any one wishing to bid. He is responsible to the seller for ordinary skill and assiduity. See APPRAISER.

Aucuba, a genus of Evergreen shrubs belonging to the natural order *Cornaceæ* (q. v.). *A. japonica*, or Japan laurel, is a common garden shrub with variegated leaves, and capable of thriving even in the atmosphere of towns. The plant is dioecious. Its berries, when ripe, are of a beautiful coral red. *A. Himalaica* has wholly green foliage and orange-red coloured berries.

Audé'us (the name is the Latinised form of the Syriac *Udo*), a native of Mesopotamia, born in the early part of the 4th c. He has an obscure place in the history of the Church as the founder of a sect which expired in the century that gave it birth. A. began by assailing the clergy for the impurity of their lives, and set an example of rigid austerity in morals, but along with his asceticism he seems to have combined certain anthropomorphic views of God which the Church could not tolerate. In A.D. 338 he was banished to Scythia or Sweden, where he formed a new sect among the Goths, and where he died about 370. His party became extinct soon after, but the anthropomorphic heresy spread through many monastic communities in the following century. See Augustine, *De Hæresibus*, c. 50, and Epiphanius, *Contra Hæreticos*.

Aude, a maritime department in the S. of France, formerly part of the province of Languedoc. It is for most part mountainous, but is intersected by rich, well-watered valleys, which yield cereals, olives, wines, and fruits. The chief industrial products are woollens, silks, leather, and paper; there are also many flour-mills, distilleries, and iron-foundries. Carcassonne (q. v.) is the chief town. A. is rich in iron, antimony, copper, and c. l. Pop. (1872) 285,297. The river A., 120 miles long, rises near Mont Louis in the Pyrenees, is fed by many tributaries in the department through which it flows, and enters the Mediterranean 6 miles E.N.E. of Narbonne.

Audebert, Jean Baptiste, a French naturalist and engraver, was born in 1759 at Rochefort. He excelled in designing and painting animals, and was much employed in this work by authors. His first work, *Histoire Naturelle des Singes, des Makis, et des Gallophilhèques* (Par. 1800), created a great sensation among naturalists. It was one of the earliest and most splendid attempts to print in oils, and to imitate the tints of nature. His *Histoire des Colibris, des Oiseaux-Mouches, des Jacanars, et des Promérops* (Par. 1802) is considered the most perfect work of the kind that ever appeared. Fifteen specimens have been printed in letters of gold. A. died in 1800.

Auditor, one who is appointed to examine accounts, public or private. The Commissioners of Audit are government officials appointed to look after the expenditure of certain branches of the public service. Their establishment is called the Audit Office. It consists of a chairman, a secretary, and five commissioners, with a staff of subordinates. The army, navy, ordnance, and land revenue accounts are now under the supervision of the Audit Office. The duties of a private A., or A. under a judicial remit, are very onerous, as, under common law, he may be held liable for the consequence of any blunder or oversight on his own part.

Auditor of the Court of Session, in Scotland, is an officer appointed by the crown, to whom either division of the court, or any Lord Ordinary, remits to tax the costs, in Scotland called expenses, of a suit found due by one litigant to the other. The A. reports to the judge, who will, if desired, hear objections on either side. He then decides on the accounts summarily and finally.

Auditory Nerve is the special nerve of the organ of hearing. It is sometimes also termed the *portio mollis* of the seventh pair of cranial nerves. It arises from the floor of the fourth ventricle at the back of the medulla oblongata. It passes into

the petrous portion of the temporal bone through the internal auditory meatus along with the facial nerve, or portio dura. It ultimately is distributed exclusively to the internal ear. See EAR, HEARING.

Au'dran, the name of several celebrated French engravers, among whom may be mentioned **Claude A.** (born 1592, died 1677), his three sons, Germain, Gérard, and Claude, of whom the first—himself a famous engraver—had three sons, all artists of note in their day; the last was a painter, who almost equalled Lebrun, and the second, **Gérard**, born at Lyon, August 2, 1640, achieved the reputation of being the greatest engraver. While practising his art in Paris, his abilities procured for him the patronage of Lebrun, the painter of Louis XIV. He afterwards studied three years under Carlo Maratti at Rome, where he executed an excellent engraving of Clement IX. The celebrity he acquired by this led to his being recalled to France, and to his appointment as engraver to the king. A work of his in folio, *Les Proportions du Corps humain mesurées sur les plus belles Figures de l'Antiquité*, was published at Paris in 1683. His finest productions are his illustrations of the battles of Alexander. G. died at Paris in 1703.

Au'dubon, John James, a very eminent American ornithologist, was born at Louisiana, May 4, 1780, of French parents. From his earliest years he displayed a passionate enthusiasm for the study of nature, especially of birds. His father established him in a farm in Pennsylvania, where he married; but neither his love for his wife nor for his family could diminish the irresistible attraction of the primeval forests of America. In a series of wanderings, commencing in 1810, and lasting fifteen years, A. executed on the spot, and from nature, those drawings which are to be found in his magnificent *Birds of America*. This work was of too costly and artistic a nature to find at that time an American publisher, but, nothing daunted, A. crossed the Atlantic, and after several delays and disappointments it was finally published at London (1826-39, 3d ed. 1864, 6 vols.), accompanied with a literary description (*Ornithological Biography*, Edinb. 1831-39). On the first appearance of the *Birds of America*, a thrill of admiration went through the *savans* of Europe, and even now the language of Cuvier does not appear extravagant—'It is the most magnificent monument that Art has yet raised to Nature.' While the publication was going on, A. continued his wanderings and observations. He visited the coasts, rivers, islands, lakes, forests, and mountains of N. America, from the Gulf of Mexico to Labrador, and in 1843 commenced his *Biography of American Quadrupeds*, which he finished in 1850 (2d ed. 1854, 3 vols.). A. died 27th January 1851. See *Lives of A.*, by St. John (1855) and Buchanan (2d ed. 1869.)

Au'ér, Aloys (Ritter von Melsbach), born May 11, 1813, at Wels, Upper Austria. At an early age he exhibited a great facility in acquiring modern languages, and in 1837 became Professor of Italian in the College of Linz, Upper Austria, and from 1841 to 1868 was Director of the National Printing Office in Vienna. But he is best known by his photographic discovery, known as *Nature Printing*. See *Die Entdeckung des Natur-selbstdrucks* (Vien. 1856). In 1847 he published the *Lord's Prayer* in 200 languages, each exemplar being in the national alphabet. A. died at Vienna, July 11, 1869.

Au'erbach, Berthold, a German poet and novelist of Jewish origin, was born 28th February 1812, at Nordstetten, in the Black Forest, studied from 1832 to 1835 at Tübingen, Munich, and Heidelberg, and first appeared as an author in 1836, when he published *Das Judenthum und die Neueste Literatur*. It was followed by a series of romances from Jewish history under the collective title of *Das Ghetto*. To this period also belong his *Spinoza* (2 vols. Stuttg. 1837; 2d ed. 1854), *Dichter und Kaufmann* (2 vols. Stuttg. 1839; 2d ed. 1854), and a translation into German of the whole of Spinoza's works (5 vols. Stuttg. 1841). Soon after, however, he entirely abandoned philosophy and criticism for creative art, and it soon became visible where his strength lay. The precursor of his new style was *Der Gebildete Bürger* (Karlsr. 1842). This was followed by his charming *Schwarzwälder Dorfgeschichten* (2 vols. Manh. 1843; 4th ed. 1848; people's ed. 1861-62). These 'Village Tales of the Black Forest' at once gave him a foremost place among popular German novelists, and in translations soon found their way into almost every European language. They are imbued

with the finest spirit of S. German life, and are marked by the most pleasant humour. One of the very best is *Die Frau Professorin*. In his *Schrift und Volk* (Leips. 1846) he discussed the conditions and characteristics of popular literature. A.'s later works are *Andree Hofer* (Leips. 1850), an historical tragedy of slender merit; *Deutsche Abende* (Manh. 1851; 3d ed. 1853); his continuations of the *Dorfgeschichten*; *Der Wahrspruch* (Leips. 1859), a drama; and the widely-admired tales, *Barfüssle* (Stuttg. 1856; 5th ed. 1863), *Joseph im Schnee* (Stuttg. 1860), and *Edelweiss* (Stuttg. 1861). A collection of his writings was published at Stuttgart in 22 vols. (1861-64). A. was editor of the *Deutschen Volks Kalender* from 1859 to 1869.

Aufrecht, Theodor, one of the first Sanskrit scholars in Europe, was born at Leschnitz, Silesia, in 1822, and was educated at the University of Berlin. He came to England with a high reputation, and was employed at Oxford (1859-62) in compiling the catalogue of the Sanskrit MSS. in the Bodleian Library. In 1862 he was appointed Professor of Sanskrit and Comparative Philology in the University of Edinburgh, and in 1875 returned to Germany to become Professor of Sanskrit and Comparative Science of Language at Bonn. A.'s works are, *De Accentu Compositorum Sanscritorum* (Bonn, 1847); *Die Umbrischen Sprachdenkmäler* (Berl. 1850); *Zeitschrift für Vergleichende Sprachforschung* (Berl. 1850); *Ujvaladutta's Commentary on the Unadisutras* (Bonn, 1859), from a MS. in the India House; *Halayudha's Abhidhanaratnamala: or, A Sanskrit Vocabulary, edited with a Sanskrit-English Glossary* (Lond. 1861); *The Hymns of the Rig-Veda transcribed into English Letters* (Berl. 1861); *A Catalogue raisonné of Sanskrit MSS. in Trinity College, Cambridge* (Camb. 1872); *The Anthology of Sarvagadharma* (Leips. 1873); *Blüten aus Hindustan* (Bonn, 1873). At present (1875) A. is preparing for the University of Oxford a larger work on the ancient dialects of Italy.

Au'geas, or Augeias, King of Elis, and one of the semi-mythical Argonauts. He fed 3000 oxen in his stalls, which Hercules in one day cleansed of the accumulated ordure of years, by leading through them the waters of the Peneus and Alpheus. A. refusing the payment agreed on—viz., 300 oxen—was slain by Hercules, with all his sons save one, named Phyleus, whom the victor placed on his father's throne.

Au'gereau, Pierre François Charles, one of Napoleon's greatest generals, was born at Paris, 21st October 1757, of humble parentage. At the age of seventeen he enlisted in the French carabineers; but tiring of military service, he quitted France and settled in Naples as a fencing-master. Returning to France after the outbreak of the Revolution, he volunteered into the army, was nominated captain of a regiment of hussars 26th June 1793, and on the 23d December of the same year was promoted general of division. He was sent to the army of Italy in 1795, and on the arrival of Bonaparte he became his lieutenant, and one of his most active and intrepid officers. During the Italian campaign A. immediately came to be ranked among the first generals of the Revolution on account of his unswerving resolution, the rapidity of his movements, his vigour of execution, which difficulties only seemed to intensify. He was with the emperor on most of his famous battle-fields, Jena, Eylau, Leipsic, &c. For his services he was created a marshal and peer of France, with the title of Duke of Castiglione; but having attached himself to the royalist cause, Napoleon, on his return from Elba, refused to accept the services which his old comrade hastened to Paris to offer. A. died 12th June 1816. A fine soldier, at least in his earlier years, A. was in other respects utterly destitute of culture or capacity, and far beneath the other marshals of Napoleon in manners and intelligence.

Au'gier, Guillaume Victor Emile, a French dramatic author, born at Valence, department of Drome, 17th September 1820. Though destined for the bar, at an early age he devoted himself to letters. His first drama, *La Cigüe* (1844), refused by the Théâtre Français, was accepted by the Odéon, where it was played with deserved success. Two years later the Théâtre Français, now alive to its own interests and to the genius of A., inscribed the condemned play in its *répertoire*. *L'Aventurière*, of a more serious cast than *La Cigüe*, was received with considerable favour. Then followed in 1849 *Gabrielle*, a comedy in five acts, full of moral reflections, and to which the French Academy decreed the Monthyon prize. *Le Joueur de Flûte*, a piece

of little value, was followed in 1852 by *Diane*, which proved a failure, though Rachel played the leading part. Many additional pieces have been composed by A. in conjunction with other writers, as *Les Lionnes Paveuses* (1858) and the *Beau Mariage* (1859), with Fouscier; *L'Habit Vert*, with De Musset; *La Chasse au Roman*, with Landeau; and an opera, *Sapho* (1851), the music of which was composed by Gounod; *La Contagion*, first entitled *Baron d'Estrigaud*, created a sort of sensation in 1866, which was intensified in 1868 by what his countrymen call a 'grand drame de passion,' *Paul Forestier*, which, like others of his pieces, is distinctly indecent. His *Polsies* (1856) are characterised by delicacy both of diction and sentiment, but his plays are radically vicious in their morality. A. was elected a member of the Academy in 1858, and became an officer in the Légion d'Honneur in the same year, and a commander in 1868.

Augite, a mineral which forms an important constituent in basaltic and volcanic rocks. It is a variety of Pyroxene (q. v.), in which the crystals are opaque, and black or dark green in colour.

Augmentat'ion, Process of, is a procedure in the Teind (Tithe) Court (q. v.) of Scotland, raised by the clergyman of a parish against the titular and proprietors of the land (Scot. heritors) from which he draws his stipend, for an increase of it. The P. of A. cannot be raised at a shorter interval than twenty years from the date of last decree for augmentation. The decree of court, when given, is for so much grain or victual; it is, however, paid in money, the amount of which is each year determined by the Fiar (q. v.) prices. P. of A. also comprehends the apportioning or 'localing' of the augmentation among the proprietors. The summons also asks for an increase in the sum hitherto allowed for the elements of communion. The usual grounds on which augmentation is asked are increase in the number of inhabitants, or extent of the clergyman's parish, or increased cost of living.

Augsburg (*Augusta Vindelicorum*), a notable city in Bavaria, capital of the circle of Swabia and Neuburg, at the confluence of the Lech and the Wertach. Pop. (1871) 51,220, of whom 33,559 are Roman Catholics. Among its public buildings are the Council House, containing the splendidly-decorated 'Golden Hall'; the residence of the old prince-bishops, in which the Protestant leaders presented the 'Augsburg Confession' (q. v.) to Charles V.; the house of the famous merchant family of Fugger (q. v.); the Cathedral, the Bavarian Armoury, the Gallery of Art, &c. A. is a very old city. It owes its origin to the colony planted here 12 B.C. by Augustus (whence its name), and which so rapidly prospered that Tacitus speaks of it as the most splendid town in all Rhetia. In the 5th c. it was ravaged by the Huns; in the 6th it came into the possession of the Frankish kings. On the division of the dominions of Charlemagne, it fell to the Duke of Swabia; but its trade and industry ever growing, it managed to secure for itself many privileges, and at last in 1276 it became a free city of the empire. In the latter part of the 14th and all through the 15th c. it was at the height of its greatness, and its burghers were famous for their love of knowledge and art, no less than for their enterprise and wealth. While the ships of the Fuggers and Welsers were on every sea, A. was at the same time the headquarters of the German school of painting. But the discoveries of the Spanish and Portuguese gave a new direction to the commerce of the world, and other cities with greater advantages soon surpassed A. in commercial prosperity. Still it long continued to be an emporium of trade between Northern and Southern Europe. Many events of the Reformation transpired in A. When the empire was abolished in 1806, A. was incorporated with Bavaria. Its trade, long retrograde, is now reviving; printing, lithography, bookselling, and the manufacture of paper being in active operation, and there are woollen and cotton factories, and numerous breweries. A. had in 1870 ten printing and 34 publishing establishments. It is also an important seat of banking and of exchange operations, a great railway centre, and the place where the *Allgemeine Zeitung*, the most widely-circulated newspaper in Germany, is published. The ancient and invaluable records of A., when it was a free imperial city, have been published in the *Chroniken der Deutschen Städte* (vols. iv. and v. Leips. 1865-67).

Augsburg Confession, the profession of faith of the

Lutheran Church, drawn up by Melancthon, with the advice of Luther, and presented to the Emperor Charles V. at the diet held at Augsburg, June 25, 1530. Having been read in German by the Chancellor of Saxony, two copies, one in German and the other in Latin (*Confessio Augustana*), signed by John Elector of Saxony and other four magnates of the empire, were presented to the emperor. Melancthon took as a basis the seventeen articles of Torgau, which had been laid before the elector by Luther in the previous year. Of the twenty-eight articles of the A. C., twenty-one state the Lutheran tenets of faith and doctrine, while the remaining seven deal with the points in dispute between the Lutheran and Roman Churches. In 1540 Melancthon published a Latin edition, containing important variations, introduced for the purpose of reconciling the views of the Lutherans and Calvinists on the Lord's Supper. These variations were repudiated by orthodox Lutherans, and they gave rise to much controversy between the Lutheran and Reformed Churches of Germany. See Köllner's *Symbolik der Luth. Kirche* (Hamb. 1837).

Augsburg Interim. See INTERIM.

Auguries and **Auspices** are essentially Latin modes of divination, and of greater antiquity than Rome itself. Both words are connected with *avis*, a bird, as it was believed that the flight of birds intimated in some way the will of the gods, and that by this Jupiter taught men how to act in given circumstances. The various kinds of signs observed by the augurs were five—*ex calo*, *ex avibus*, *ex tripudiis*, *ex quadrupedibus*, *ex diris*. The first, which was of prime significance, was connected with the observation of thunder and lightning. The second related to A. from birds, of which there were two classes: *oscines*, as the raven and the crow, which gave A. by their voice; and *alites*, as the eagle and the vulture, which indicated the will of the gods by their flight. The A. *ex tripudiis* were taken from the feeding of chickens, and were consulted on military expeditions; *ex quadrupedibus*, from four-footed animals, as the hare, wolf, or dog; *ex diris*, from sneezing, stumbling, and other accidents. The person who was to take the A. marked out with a wand a division in the heavens called *templum*, a term also applied to the station he occupied, which was solemnly separated from the rest of the lan. At Rome a station on the summit of the Capitoline Hill had been consecrated for this purpose once for all. The *templum* was divided into right and left, and the A. were favourable or the reverse as the birds appeared in the one division or the other. In ancient times no plebeian could take the A., while every patrician could. No important undertaking, public or private, was in the early period of Roman history entered upon without consulting the A. Hence the power and influence of the augurs were paramount, and a veto of a single member of their college could disperse the Comitia Centuriata. In war, the power of taking the A. was restricted to the commander-in-chief; any victory won by his lieutenants was said to be won 'under his auspices,' and he alone was entitled to the honour of a triumph. The phrase 'under his auspices' now simply means under the favour or influence of another; but even in classical times it had acquired this figurative use.

August (It. and Sp. *Agosto*, Fr. *Août*), the name given by Augustus to the sixth month of the Roman year, originally *Sextilis*, when he rectified an error in the method of intercalating. The decree of the Senate ratifying the change assigns as reasons for it that in Sextilis had happened some of the most fortunate events in the life of the emperor, and that 'the said month is, and had been, most fortunate to the empire.'

Augusta, the capital of Maine, U.S., on the navigable river Kennebec, 60 miles N.N.W. of Portland. It contains a handsome state house of whitish granite, and a large arsenal. In 1865 the whole business quarter was destroyed by fire, but was soon after restored. The river, on which steamboats ply for 20 miles above A., is here spanned by a bridge 520 feet long. Pop. (1870) 7808.

Augusta, a flourishing town in Georgia, U.S., on the Savannah, 120 miles from its mouth. It lies in the centre of a rich cotton-growing district, and has ample railway and river communication. A bridge here connects A. with Hamburg, in S. Carolina. Pop. (1870) 15,389.

Augustenburg, a village on the Prussian island of Alsen,

with 1116 inhabitants, near which is a fine castle, formerly the residence of the Duke of Holstein-Sonderburg-Augustenburg.

Augusti, Johann Christian Wilhelm, a German theologian, born at Eschenberga, near Gotha, in 1771, and studied under Griesbach at Jena, where in 1798 he became a lecturer in philosophy. In 1803 he succeeded Ilgen as Professor of Oriental Literature, and in 1807 became Professor of Theology. Appointed Professor of Theology at Breslau in 1811, he was transferred to Bonn in 1819, and was made Director of the Consistory of Coblenz in 1833. He died 28th April 1841. A. was originally rationalistic, but became much more orthodox in his later years. His best-known works are his *System der Christl. Dogmatik* (Leips. 1809), *Grundriss einer Histor.-Kritischen Einleitung in das Alte Testament* (Leips. 1806), *Lehrbuch der Christl. Dogmengeschichte* (Leips. 1805), and, above all, his *Denkwürdigkeiten aus der Christl. Archæologie* (12 vols. Leips. 1817-31).

Augustine, Aurelius St., was born at Tagaste, a village in Numidia, 13th November 354. His father, who filled the office of a magistrate, was a pagan till nearly the close of his life; but his mother, Monica, to an exquisite tenderness of heart added all the graces of religion, and strove—though for years her work seemed to be fruitless—to imbue her son with her own pious convictions. After receiving a good school education, he was sent at the age of seventeen to prosecute his studies at Carthage. There he fell a prey to the temptations of the place, became exceedingly dissolute, and at the age of eighteen became the father of a natural son. By reading Cicero's *Hortensius* he became enamoured of philosophy, and not finding what he sought in the Bible, he adopted the Manichæan system. He now returned to his native town, where he gave instructions in literature; but about 380 again settled in Carthage, where he taught literature for three years; and at this period he abandoned the Manichæan system. In 383 he went to Rome, and next year to Milan, in the character of teacher of literature. There he was attracted by the eloquent preaching of Ambrose, Bishop of Milan; under whose influence he became a Christian, and was baptized, along with his son Adeodatus, in 387. Next year he returned to Africa, where, according to the practice of converts at the time (see Acts ii. 44, 45), he sold his estate, devoting the proceeds to charitable purposes, and lived as a recluse, with a few like-minded companions. In 391 he went to Hippo (Bona, Algeria), where he was ordained a priest, and preached with marvellous success both in the Latin and Punic tongues. His suppression of the stone-fights at Cæsarea, in Mauritania, by the irresistible eloquence of Christian pathos, is a splendid evidence both of his heroism and his faith. In 395 he was appointed colleague to the Bishop Valerius, and from that time till his death he was indefatigable in preaching and writing, combating error and ungodliness, and infusing spirituality into the churches far and wide. Nothing could surpass his chivalrous magnanimity, his lowliness of heart, his noble humanity. Whether teaching little children, defending the poor and the oppressed, selling the ornaments of the church and even the vessels of the altar to ransom slaves, or exhorting priests never to abandon their flocks, he was always the heroic follower of his Divine Master. The Vandal invasion of Africa broke his heart, but did not quell his courage. When the barbarians besieged the city of Hippo, A. was foremost in encouraging and consoling the inhabitants, but his death in the third month of the siege (28th August 430) rendered his enthusiasm unavailing.

From the time of the condemnation of Pelagianism (q. v.), at the Council of Carthage (412), he devoted his whole energies to refute and crush the doctrines called by that name. It was mainly in that controversy that he developed the scheme of doctrine which has been the moving power in the Church ever since. It was sanctioned by the Latin Church, repudiated by the Church of Rome in the Council of Trent, adopted by the Reformers, and incorporated more or less in all the Protestant Confessions, forming especially the backbone of Calvinism. The principal features of the scheme are as follows: 1. That solely for his own glory God purposed the creation of the universe, and the whole plan of providence and redemption. 2. That mankind were placed in a state of probation. 3. That they were brought, by the fall of Adam, into a state of condemnation, from which they are utterly unable to deliver themselves. 4. From the mass of fallen men God elected a certain number to eternal life, and left the rest to the just recompense of their sins. 5.

That the sole ground of this election is the good pleasure of God. 6. That, for the salvation of those thus elected, God gave his Son to suffer for his people; thus making a full satisfaction for sin, and rendering the ultimate salvation of the elect absolutely certain. 7. That although the Holy Spirit operates more or less on all men in restraining evil and exciting good, his efficacious and saving power is excited only on behalf of the elect. 8. That all the elect shall certainly be brought to the knowledge of the truth, the exercise of faith, and perseverance in holy living unto the end. As a thinker A. has the first place among the fathers, not merely because of the work he did, but the way he did it. 'Of all the fathers of the Latin Church,' says Villemain (*Tableau de l'Eloquence de la Chaire au quatrième Siècle*, Paris, ed. 1849), 'St A. is the one who carried most imagination into the sphere of theology, most eloquence and sensibility into scholasticism. Give him another age, place him under a happier civilisation, and no man would have displayed a vaster or more plastic genius. Metaphysics, history, antiquities, morals, science—everything he embraced.' Perhaps a later age might have purified the style, and modified the opinions of A., but it could not have added to his faith or enriched his genius.

Of A.'s works, which fill eleven volumes of the Benedictine edition (Paris, 1679-1710; Antw. 1700-3), perhaps the most powerful is his *City of God*; the best known and most read, his *Confessions*. See Poujoulat's *Vie de Saint Augustin* (Paris, 2d ed. 1852).

Augustine, St., the founder of the English Church, and the first Archbishop of Canterbury, was abbot of the monastery of St Andrew, Rome, when he was sent by Pope Gregory I., with nearly forty companions, to preach the gospel to the pagan English, A.D. 596. According to Bede (*Hist. Eccl.*, lib. ii. cap. 1), Gregory's interest in our countrymen was first excited by seeing some English boys for sale in the Roman market. Be that as it may, the missionaries, in obedience to the papal command, set out for Britain, and landed in the Isle of Thanet. They were hospitably received by Æthelberht, the Kentish king, who was then Bretwalda, obtaining permission to evangelise his subjects and to dwell in the city of Canterbury. Probably the fact that Æthelberht had a Christian wife of the Frankish nation, who by the marriage contract was permitted to privately practise the rites of her religion, predisposed him to favour the newcomers. Bede attributes the success of the missionaries in the work of conversion to the purity of their lives and the sweetness of their heavenly doctrine. The king himself soon received baptism, but he did not, like some princes, force his subjects to follow his example. Voluntaryism, however, was more effectual than compulsion, for we are told that great numbers of the English of their own accord embraced Christianity. In the same year in which he commenced his missionary work, A. was made *Anglorum Episcopus* ('Bishop of the English people'), and thereafter sent two priests to Rome to obtain the advice of Gregory regarding the government and usages of the new Church, and the limits of his own authority. The Pope's replies are admirable for their good sense, liberality, and piety. In 601 additional missionaries were sent into the island, with all the requisites for religious service—sacred vessels, vestments for the altars and the clergy, ornaments for the churches, relics of the martyrs, and learned books. A. had, on the whole, wonderful success among the English; but the Britons, who had a Church of their own, refused to depart from their ancient customs regarding Easter and baptism, or to acknowledge his authority. For this contumacy, Bede considers, they were afterwards righteously defeated with great slaughter by the English king Æthelfrith. A. died in 604, and was buried in the church at Canterbury. See Stanley's *Historical Memorials of Canterbury* (Lond. 1855), and Green's *Short History of the English People* (Lond. 1875).

Augustines, or Augustinians, the name of numerous religious orders in the Roman Catholic Church, among which may be mentioned—(1.) The CANONS REGULAR OF THE ORDER OF ST AUGUSTINE, or AUSTIN CANONS, brought into England probably in 1105, and had their first house at Colchester, and not at Nostell in Yorkshire, as stated by Reyner. They had about 170 houses in England, and about 25 in Scotland, the earliest being founded at Scone in 1114. Their discipline was less strict than that of other orders of monks; they took the vows of chastity and poverty, and their habit was a long black cassock, with a white rochet over it, having over that a black cloak and

hood. (2.) The HERMITS OF ST AUGUSTINE, or AUSTIN FRIARS, a very austere order, who lived on the alms of the faithful, were placed by Pope Innocent IV., about the middle of the 13th c., under the rule ascribed to St Augustine; Alexander IV. in 1256 placed them under a president with the title of 'general'; and they were long governed by a code of rules compiled in 1287; but as the middle ages drew to a close, the order (like most others) degenerated, and new religious brotherhoods were formed in the hope of effecting a reformation. The DISCALCEATE (i.e., 'Barefooted'), a very austere order of A., were established in 1570; but the system of religious life which such orders embodied and sought to advance was not in harmony with the ideas of modern times, and after that great revolt against the past known as the French Revolution, the A. were almost everywhere either suppressed or curtailed. (3.) An order of nuns, said to have lived under the direction of Augustine himself, had also the name of A. Their garments were black till 1632, when they were exchanged for violet. They still minister in the Hôtel-Dieu at Paris.

Augustowo (*Augustow*), a town of Poland, province of Suwalki, on an affluent of the Bug, 138 miles N.E. of Warsaw, founded in 1557 by August I., whence its name. It has linen and woollen manufactures. Pop. 10,050.

Augustulus, **Romulus**, the last Emperor of the West, and son of Orestes, who, after driving out the Emperor Julius Nepos, had A. proclaimed emperor, A.D. 475, himself retaining all real sway. The diminutive A. was applied to him on account of his youth and the insignificance of his character. After Orestes was put to death by Odoacer at Pavia (A.D. 476), A. was exiled to the villa of Lucullus, with an annual allowance of 6000 pieces of gold, after which his name disappears from history. By a curious coincidence the last Emperor of Rome bears the same name as the mythical founder of the city.

Augustus, **Caius Julius Cæsar Octavianus**, commonly known in history as A., was the first Roman emperor. He was the son of C. Octavius and Atia, daughter of Julia, the sister of Julius Cæsar, and was born B.C. 63. The native place of the Octavian family was Velitæ. During his early years A. received many marks of Cæsar's attachment, and was adopted by him as his son and heir. After Cæsar's murder, B.C. 44, A. came from Apollonia, where he had been studying, to Rome, and claimed his inheritance. He was opposed by Antony, then all-powerful, but with great tact and skill he won the favour of the nobles, the people, and the soldiers; and, on the proposal of Cicero, he was intrusted with the command of the army against Antony, whom he drove across the Alps. Notwithstanding the opposition of the aristocratic party, A. obtained the consulship, and marched into the N., where he met Antony and Lepidus, to whom he was reconciled, and with whom he formed a triumvirate, Lepidus obtaining Spain; Antony, Gaul; and A., Africa, Sardinia, and Sicily. After the destruction of their enemies, and the extinction of the Republican party at Philippi, B.C. 42, Lepidus obtained Africa and A. Italy. The war excited by Fulvia, wife of Antony, was brought to a close by her death, and Antony then married Octavia, sister of A., the eastern provinces being now assigned to Antony, and the western to A. After defeating Sextus Pompeius and Lepidus, A. addressed himself to his great contest with Antony for the supremacy of the Roman world. Antony was now the slave of Cleopatra's charms, and the Romans, having declared war against her, gained a complete victory in the sea-fight at Actium, B.C. 31, after which Antony and Cleopatra committed suicide. In B.C. 29, A. returned to Rome and celebrated a triple triumph. Honours were showered upon him. He received in succession the prefix of imperator, the potestas censoria, the principate, the proconsular power in the provinces, and the title of A. In B.C. 27 he offered to resign the imperium, but was induced to resume it. Monarchy had already commenced, and A. gradually combined in his own person the prerogatives of various republican offices—the imperium, the principatus, the consulship and proconsular command, the potestas tribunicia, the potestas consularis, and the supreme pontificate. Broken down by the overthrow of Varus, by domestic grief, by advancing years, he retired to Campania to recruit his strength, but died at Nola, A.D. 14. A.'s wonderful personal history amply attests his possession of rare gifts as a ruler of men.

During the later portion of his life his policy was mild, and he introduced many important reforms. He greatly beautified the city of Rome: 'he found it of brick and left it of marble.' His age was the most brilliant period of Roman literature, and was adorned, amongst others, by the poets Virgil, Horace, and Ovid, and by the historian Livy.

Augustus (Ger. *August*) **I.**, Elector of Saxony, son of Duke Heinrich the Pious, born at Freiberg, 31st July 1526, married Anna, daughter of Christian III. of Denmark, in 1548, and succeeded to the electorate in 1553. In relation to the early Protestant Church, he first exercised his influence in favour of Calvinistic doctrines, but later, in 1574, he assumed a hostile attitude to Calvinism, and took up Lutheran tenets. A skillful administrator and reformer, he fostered education, agriculture, and trade. He founded the library, as well as much of the artistic and scientific institutions, of Dresden. A. married a second time in January 1586, but died a month afterwards.

Augustus II., **Friedrich**, named the Strong, Elector of Saxony and King of Poland, son of the Elector Johann Georg III., born in Dresden, 12th May 1670, succeeded his brother Georg in the electorate in 1694, and having changed his creed was chosen King of Poland in 1697, after Sobieski had vacated the throne. Failing to win back for Poland the provinces that had been ceded to Sweden, he was deprived of the crown by the Polish Diet, 14th February 1704. By the peace of Altranstädt, which he was compelled to conclude with Charles XII. of Sweden (24th September 1706), he abdicated the crown of Poland in favour of Stanislaus. The overthrow of the power of Sweden, by the crushing defeat of Pultowa (q.v.), restored A. to the throne of Poland. He now devoted himself to the object of driving the Swedes out of Germany. The death of Charles XII. in 1718 brought hostilities temporarily to a close. From the date of the death of Charles XII. to his own death, 1st February 1733, A.'s reign was unmarked by incidents specially worthy of note. His restoration to the Polish throne was unfortunate for Poland, for Saxony, and for himself. He squandered the resources of his subjects, even in times of famine, upon his mistresses, who were many, and his illegitimate children, who were 354 in number. Even his patronage of the fine arts in Saxony arose merely from that love of indulgence and luxury which was the ruling passion of his life. He is repeatedly sketched in the first and second books of Carlyle's *Friedrich*, in phrases that are unsurpassably graphic and essentially true. 'The gay, eupeptic son of Belial' has a place in history, though it is not an enviable one.

Augustus III., **Friedrich**, Elector of Saxony and King of Poland, the only legitimate son of the preceding, was born at Dresden, October 7, 1696. He succeeded to the electorate on the death of his father, and was chosen King of Poland, 5th October 1733, through the overpowering influence of Austria and Russia, and in spite of the influence of France, under whose protection, and supported almost unanimously by the Poles themselves, Stanislaus Leszcynski had been elected king on the 12th September preceding, but was obliged to fly from Warsaw before the advancing troops of Russia ten days afterwards. A. continued to be the dependant of the powers that had placed him on the throne, though the vacillating policy of his chief minister, Brühl, frequently compromised him. In the first Silesian war, he was on the side of the Prussians, but instigated by Brühl, who mortally hated the great Prussian king, A. formed a secret alliance with Austria. The result was that, in the second Silesian war (1745), Friedrich II. having defeated the allied troops of Maria Theresa and A., pushed on into Saxony, and occupied the capital, in which the state papers had been left, though the art treasures had been saved by the king. In the third Silesian war, again invading Saxony (1756), Friedrich took the whole Saxon army captive in its entrenched camp at Pirna. A. fled to Poland. On the threat of invasion by Russia, however, he returned to Dresden, where he died, October 5, 1763, the anniversary of his election to the Polish throne thirty years previously. See Carlyle's *History of Friedrich II. of Prussia*.

Auk (*Alca*), a genus of Natatorial or Swimming birds, belonging to the family *Alcidae*, which forms a division of the *Brevipennate* or 'short-winged' swimmers. The feet are placed towards the hinder extremity of the body, the hinder toe of each foot being wanting. The three front toes are fully webbed.

The wings, although small, are yet provided with quill-feathers, and are more useful for swimming and diving than for flight.



Great Auk.

The hinder position of the feet enables these birds, when on land, to assume an erect attitude, whilst their gait is unwieldy and awkward. But in the water they are exceedingly active, and swim and dive with great facility. The bill is much compressed, and is sharp on its upper or elevated edge. These birds are distributed in the northernmost regions of the world, the penguins replacing them in the southern hemisphere. The great A. or gare-fowl (*Alca impennis*) is now but rarely met with, having been almost completely exterminated by man. The Arctic seas, the Orkney and Shetland Isles, form its chief

habitat, and it has been occasionally shot on the coasts of Britain. The great A. produces but a single egg, averaging about 5 inches in length by 3 in diameter. The lesser A. or rotche (*Mergulus* or *Alca alle*) is nearly allied to the guillemots. It possesses a short conical bill, and inhabits the northern Arctic seas, visiting Britain in winter. The Puffins (q. v.) are nearly related to the auks, but are included in the distinct genus *Fratereula*. The Penguins (q. v.) (*Spheniscus* and *Aptenodytes*) are also included in the family Alcidae. The Razor-bill (q. v.) (*Uria* or *Alca torda*) is more nearly related to the auks, however. The wings in this latter form are proportionally larger than in the auks.

Aulapalay, or **Aleppi**, a town of India, on the coast of the native principality of Travancore. It has a trade in timber, brought from the forests of the W. Ghats, in betel-nut, cocoa, coffee, and in pepper, while canals furnish facilities for internal communication. A. has no harbour, but there is good anchorage a few miles from the shore. Pop. 7000.

Aulic Council (Lat. *aula*, court), a court of the old German empire dating from 1495, and from 1654 taking equal rank with the Imperial Chamber. Though from the first performing important functions, it had no definite constitution till 1559. Its members were a president, vice-president, vice-chancellor, and eighteen councillors, the last being classed as counts, barons, and men of learning. It did not interfere with the political affairs of the empire, but confined itself to feudal processes and investitures, and to matters connected with the imperial jurisdiction in Italy. The A. C. was dissolved on the death of each emperor, and reconstructed by his successor. It disappeared with the abolition of the old German empire by Napoleon in 1806.

Aumale (Lat. *Alba Mala*, *Albanaria*, *Aumalcum*), a French title reaching back to at least the middle of the 11th c., when Eudes, son of Henri-Ftienne, Count of Troyes and Meaux, bore the title of Comte d'A. In the 13th c. it passed to the house of Ponthieu, and in the 15th to that of Lorraine. On the death of René II. (1508), the title and estates went to his younger son Claude, Duc de Guise. In 1547 Henri II. raised it to a dukedom in the person of François, subsequently Duc de Guise, who surrendered it to his brother, Claude de Lorraine. In 1638 it passed to a branch of the house of Savoy, and in 1675 it was conferred on the Duc du Maine, legitimate son of Louis XIV. At a still later period the title was borne by princes of the blood royal of France. Among the more notable D'Aumales of history are—1. **Jean d'Arcourt**, eighth Oomte d'A., and **de Mortain**, surnamed *Le Mal des Anglais*, was born in 1396. He fought at Agincourt (Oct. 25, 1415), Bernay, and Crevant, but is most fondly remembered by his countrymen for his brilliant victory over the English at Gravelle (26th September 1423). He perished the year following in the disastrous battle of Verneuil, which was fought contrary to his advice.—2. **Claude de Lorraine**, first Duc d'A., born about the close of the 15th c., fought at Marignano (1515), conquered the duchy of Luxembourg (1542), and died at Joinville, 12th April 1550.—3. **Claude II. de Lorraine**, Duc d'A., third son of the foregoing, born in 1523, took part in the capture of Calais, the battles of Dreux, St Denis, and Montcontour, and in the

massacre of St Bartholomew. He was killed at the siege of Rochelle, 14th March 1573.—4. **Charles de Lorraine, Duc d'A.**, born 1554, was one of the leaders of the politico-religious league which, under the pretext of suppressing the Huguenots, attempted to raise to supreme power his kinsmen the Guises. In 1589 he seized Paris and cast the members of the parliament into prison, but shortly after he was defeated at Senlis by La Noue, and again in the same year at Arques and Ivry. He held Paris for some time against the forces of Henri IV., but finally surrendered, and suddenly joined the Spaniards, who had invaded Picardy. For this he was found guilty of high treason, and sentenced to be broken alive on the wheel. He escaped, however, and died, after a long exile, at Brussels in 1631, being the last scion of his race.—5. **Henri-Eugène-Philippe, Louis d'Orléans, Duc d'A.**, the fourth son of the late King Louis Philippe, was born at Paris, 16th January 1822. He was educated at the Collège Henri IV., and at the age of sixteen entered the army, where he rapidly rose to distinction. In Algeria he crowned a series of brilliant services by surprising Abd-el-Kader (16th May 1843), and capturing 3600 prisoners, with the emir's treasure and correspondence. A. was made governor-general of Algeria in 1847; but on the revolution of 1848, by which his father was driven from France, he resigned his post and withdrew to England. Since then he has gained considerable reputation as an author. The chief of his writings are—*Les Zouaves et les Chasseurs-à-pied* (1851); *Lettre sur l'Histoire de France* (1861); *Histoire des Princes de Condé* (1869, Engl. transl. 1871, 2 vols.); *Qu'a-t-on fait de la France?* (1868); and several important articles in the *Revue des Deux Mondes*, chiefly on political subjects. In 1871, on the repeal of the law banishing the house of Orleans, he returned to France, and was elected a member of the Assembly. On the 10th of March 1872 he was created a general of division, and in this capacity presided over the council of war which tried Marshal Bazaine (October 6 to December 10, 1873) for the facile surrender of Metz. He was elected a member of the Academy in 1871.

Aune (Lat. *ulna*, Eng. *ell*), a French measure of length = $1\frac{1}{2}$ mètre = $47\frac{1}{2}$ English inches. The English ell = 5 quarters, or 45 inches.

Aun'oy, Marie-Catherine-Jumelle de Berneville, Comtesse d', a French authoress, best known for her fairy tales, *The Yellow Dwarf*, *The White Cat*, &c., still popular with the young. She also wrote romances and historical memoirs, both of which have ceased to be read. She was born about 1650, and died at Paris, January 1705.

Aurantia'ces, an order of Dicotyledonous shrubs and trees abounding in the E. Indies, and embracing upwards of one hundred species. All the plants of the order exhibit receptacles of volatile oil in their leaves and the rind of their fruit. The genus *Citrus* (q. v.) is the most important in the order, yielding a variety of agreeable fruits (see ORANGE, LEMON, LIME, CITRON, SHADDOCK, &c.). *Egle Marmelos* also yields an excellent fruit (see EGLE). A gum resembling gum-arabic is procured from *Feronia elephantum*. *Skimmia Lauricola* is the only plant of the order found in cold regions. It grows on the tops of the mountains in Northern India, where it is covered for some months of the year with snow. *Bergera Kunigi* is known as the curry-leaf tree, its aromatic fragrant leaves being used to flavour curries. The leaves, bark, and root are also used medicinally. Simbolee oil is extracted from its seeds. The fruit of *Cookia punctata* is called wampee in China and the Indian Archipelago.

Aurelia. See CHRYSALIS.

Aurelianus, Lucius Domitius, otherwise **Valerius**, or **Valerianus A.**, a Roman emperor, born a Pannonian or Dacian peasant about A.D. 212. From being a common soldier, by his valour and skill displayed in all parts of the empire—Sarmatia, Gaul, Illyria, Thrace, and the valley of the Danube—he gradually rose to the highest commands, and on the death of Claudius, was elected emperor by the army, A.D. 270. His short reign of four years and a half presents a series of the most brilliant exploits. He routed the Goths and Vandals who had invaded Pannonia, expelled the Alemanni from Italy after inflicting on them a great defeat near Fano; then turning his arms to the East, besieged the famous Zenobia (q. v.) in

Palmyra, took her prisoner, and destroyed the city shortly after. But though Italy and the East owned his authority, and his fame was spread far beyond the Euphrates, the West was still in the hands of a rival named Tetricus. A battle fought near Chalons, however, made A. master of the Roman world. Yet fortune was in a sense unkind to this able man. Insurrections and conspiracies were frequent, in spite of his energy, courage, and liberality, and he was finally slain in March, A.D. 275, the result of a conspiracy organised by Minestheus, his private secretary. The chronology of the reign of A. is extremely confused.

Aurelius, Marcus. See ANTONINUS.

Auricles, the term applied to the lesser chambers of the heart of animals, the function of which is to *receive* the blood for transmission to the larger propelling chambers, or *ventricles* (see HEART). The name is derived from the Latin *auricula*, a little ear, and has been thus applied in allusion to the supposed resemblance of the cavity to an ear.

Auricula, a genus of *pulmoniferous* or 'air-breathing' *Gastropodous* mollusca, in which a spiral shell covered by a horny epidermis exists. There is no *operculum*, or plate for closing the aperture of the shell. The mouth of the shell is elongated, and its edges may be toothed or serrated. The spire of the shell is short. These forms are found in warm regions; they inhabit fresh-water marshes, although they are air-breathing forms. The *A. Mida*, or 'Midas' ear' shell, is a familiar species.



Auricula.

Auricula, the common name for *Primula Auricula*, a favourite garden flower belonging to the order *Primulaceæ* or Primrose (q. v.) family. The plant is a native of the Swiss Alps, and has yellow flowers, but there are now numerous fine varieties in cultivation of various shades of colour. Many of these flower freely during April and May, in open, shaded borders; some of the finer sorts, however, being generally grown in flower-pots in a greenhouse or cool frame. They succeed best in a rich soil composed of fresh loam, mixed with well-rotted horse or cow dung, and a certain amount of white sand. They can be propagated either by offsets or by seed. The leaves of A. are said to be used by the inhabitants of the Alps as a cure for coughs.

Auricular Confession. See CONFESSION.

Aurillac, the capital of the department of Cantal (Auvergne), France, on the Jourdanne, 144 miles W. of Bordeaux, at the junction of the four roads to St Flours, Rodez, Tulle, and Clermont. It has considerable manufactures of jewellery, copper utensils, blonde lace, leather, carpets, and beer. There are horse-races here from 1st to 15th May, and near the town is the famous model farm La Peyrouse. A. is the birthplace of Pope Sylvester II., and of the revolutionist Carrier. The town is said to have grown up round a Benedictine abbey founded here in the 10th c. by St Gerard. It was frequently besieged by the English in the 14th and 15th centuries, and was eight times taken and retaken in the 16th c. during the Huguenot wars. Pop. (1872) 8795.

Aurochs (*Bonassus* or *Bos Bison*), the **Urus** or **European Bison**, an ox or member of the family *Borida*, of large size, found at present in the Caucasian forests in a wild state, and also maintained by the Emperor of Russia in a Lithuanian forest—that of Bialoweiza. It formerly abounded wild in all the European forests, and has been regarded by some naturalists as the parent of our domestic breeds of cattle. The head is broad, and forehead arched; the hair of the forehead is long, and that of the chin and breast form a 'beard.' The tail is tufted. The colour is a dark or dusky brown. These animals attain their full growth at the fifth year, and the females are smaller than the males.

Aurora, the Latin name of the Greek *Eos*, the goddess of the dawn, or 'ruddy morn,' daughter of the Titans Hyperion and Theia in classical mythology. In the morning she ascended from the ocean to heaven, and announced the coming light to

gods and men. She was represented as a maiden with large wings, clad in white and purple, a star on her head and a torch in her hand, and driving a chariot drawn by four white steeds. She carried off Tithonus, with whom she lived beside Oceanus, and to whom she bore Memnon and Emathion. In the name we can still discern a form of the story antecedent to the myth. A., from *aurum*, 'gold,' and that from *urere*, 'to burn,' is really the same word as the Gr. *eos* and the Sansk. *ushas*, a name for the dawn, and points to a time when the figurative language of the solar myth had not yet begun to be misapprehended.

Aurora Borealis, or, as it should be more properly called, Polar Light, there being also an *Aurora Australis*, is a singularly

beautiful luminous phenomenon, generally in a state of incessant commotion, and often accompanied by most magnificent combinations of colours and tints. In our latitude, an aurora generally appears first as a misty fog stretching along the horizon from N.E. to N.W.; but gradually as it rises towards the magnetic zenith, it becomes more distinctly marked, resembling more or less perfectly a gigantic arch whose extremities rest on



Aurora Borealis.

the horizon, and whose apex lies very near, if not on, the magnetic meridian of the place from which it is viewed. Then commence those well-known streamers, shivering, dancing, darting, and, if prolonged sufficiently, culminating at that point in the heavens indicated by the prolongation of the dipping needle. If several rays meet at this spot *en masse*, they form a portion of a brilliant corona or crown, which has been called the *Boreal Crown*. When this stage is reached, the display has attained its maximum intensity, and gradually the brilliancy diminishes, until at last only the misty cloud remains, and it also in time fades from view. In more northern latitudes, where auroræ are seen to best advantage, the streamers combine and form indescribably beautiful and graceful folds, resembling a gigantic variegated curt. ...suspended from dingy clouds, and shaken as it were by the wind. Noises, compared to that produced by the rubbing of two pieces of rock upon one another, or even to the rattling of firearms, have been heard by some observers, but there is no trustworthy evidence on this point.

There is no doubt that the A. B. is a terrestrial phenomenon occurring at various heights, which depend to a great extent upon surrounding circumstances. Nor can there be any question of its electrical or magnetic nature, seeing what great effects an auroral display of any magnitude produces upon magnetic needles and also upon electric telegraphic erections.

Of late years a remarkable similarity between the frequency of auroræ and the variation of magnetic declination has been observed, both apparently having almost identical periodic variations. Quite recently lines, each of which is drawn through stations for which the mean frequency per annum of auroral displays is the same, have been laid down, and these so-called *isochasmen* lines are perpendicular to the magnetic meridians, and parallel to the lines of magnetic declination. The line of maximum frequency passes just N. of the Faroe Islands and Norway, through the northern portion of Nova Zembla, to the N. of Asia and Behring Straits, through Hudson's Bay and the N. coast of Labrador, and just S. of Cape Farewell. This line, as with all, tends to follow the limits of perpetual ice depending upon the form of the continents, the greatest deviations being where the ice-limits are most irregular, as in Hudson's Bay and the Gulf of Labrador. M'Clintock observes that in the Polar regions auroræ were most frequently visible when water was in sight; and Hayes has remarked that the direction depended to a great extent upon the position of a portion of water with respect to the observer. Ice or water seems, then, to have a great effect upon auroral displays; and the presence of the Alps may very probably occasion the frequent appearances in N. Italy.

Aurangabad, more correctly **Aurangabad** ('Throne-town'), a walled town in the territory of the Nizam of Hyder-

abad, formerly capital of Dowlatabad, India, on the Dūdna, a branch of the Godavery, 180 miles N.E. of Bombay. It takes its name from its founder, Aurungzebe, and contains the mausoleum of his daughter, an inferior imitation of the famous Taj Mahal at Agra. It was the residence of the Nizams till the advance of the Mahrattas forced them to withdraw to Hyderabad, but still possesses a military station. It lies at the junction of four military roads, in an unhealthy and swampy valley surrounded by naked rocky heights; but it is the best watered town in India: every house has a tank and a well. Its mosques and palaces are in ruins, but the bazaar is important, and the town is happily situated for a transit trade with Bengal, Bombay, Delhi, and Hyderabad. Pop. 30,000. A. is the name of at least other three places in India.

Aurungzebe, or Aurangzib ('Ornament of the Throne'), the last of the great Mogul Emperors of Hindustan, was the third son of Shah-Jehan, and the grandson of Akbar (q. v.), and was born 22d October 1618. The other children of Shah-Jehan were Dara-Shikoh, Sultan-Shujā, and Murad-Baksh, and the princesses Padishah Begam, and Roshnara Begam, to the latter of whom A. was much indebted for the success of the intrigues which secured him the crown. His career divides itself into three great periods. During the *first* of these, which lasted twenty-five years (1633-58), A. sought to win the support of the Mussulman priesthood by his austere zeal and fanatical devotion, which formed a striking contrast to the careless irregularities that marked the lives of his brothers. All of them governed districts of the empire under their father, and when the latter, in 1657, fell dangerously ill, Dara, the eldest, immediately grasped the reins of power. The others soon combined against him, and Dara was forced to flee. It is not necessary to trace the steps by which A. obtained the throne. One after the other his brothers and their children were assassinated or poisoned, Shujā perishing miserably in Aracan with all his family, while the aged Shah-Jehan, now fallen into imbecility, remained a captive in the hands of A., who cunningly showed him a harmless deference and homage. In 1658 A. was practically master of the empire, but in 1661 he was without a competitor. The *second* period in his career extends from 1661 to 1670, during which his dominions enjoyed, on the whole, a profound peace; but it is, nevertheless, marked by the rise of a hostile power, the Mahrattas, whose successes in the long-run fatally weakened the Mogul empire, and hastened its decay. Sevaji, the Mahratta adventurer, of whom Akbar would have made a friend, A. turned into a mortal enemy by his rancorous Mussulman bigotry, and his crafty and deceitful policy, but some time elapsed before the strife assumed an irreconcilable character. Meanwhile Shah-Jehan died, 1666; but many years elapsed before A. allowed himself to be proclaimed emperor, alleging with unsurpassable hypocrisy that he did not care for the dignity. The *third* period begins with 1670, and closes with his death in 1707. It again subdivides itself into two parts, the first reaching from 1670 to 1675, and marked chiefly by a defeat inflicted by Sevaji on the imperial forces (1672), and by an Afghan war, in which a great victory of the Afghans (1670) forced A. to take the field in person; the second occupied the remainder of his career, and is wholly taken up with the Rajput and Mahratta struggle. All the virtues and vices of A. were displayed in this protracted and desperate strife; his intolerance, superstition, narrowness of political view, habits of intrigue and dissimulation, distrust of everything and everybody, passion for glory, profound sense of order and organisation, temperance and simplicity of life, mildness of manner, and love of knowledge. But in a ruler there is no greater crime than religious bigotry, and his persecutions after 1679 of the Hindu Rajpoots alienated from A. for ever the affections and the obedience of those warlike chiefs, who were the mainstay of the Mogul empire; and, though he succeeded in capturing (1689) Sambhaji, the son and successor of Sevaji, whom he put to death with cruel tortures, yet the resistance of the Mahrattas continued unabated by successive defeats, and at the close of his career they were stronger and more enterprising than ever. During 1685-88, A. by intrigue, stratagem, perfidy, even more than by military skill, conquered Bijapur and Golconda, possessions of little value to him, except as adding to the force which he could turn against the guerillas S. of the Vindhya. The last years of his life were made miserable by the disobedience and ambitious rivalries of his sons, by remorse for the crimes he had committed, the

dissolution of discipline in his armies, the increasing disorder of his finances, and his terror at the approach of death. The picture presented to us in his correspondence, which still survives, is a deplorable one, and should convey a solemn lesson to all who would dare to 'wade through slaughter to a throne.' A. died at Ahmednuggur, 21st February 1707, at the age of eighty-nine, after a reign of half a century. Because he persecuted the Hindus, he took the title of *Mohi-Uddin*, 'Restorer of Religion'; and on account of his numerous victories, *Alamgir*, 'Conqueror of the World.' See Elphinstone and Mill's *Histories of India*.

Auscultation is the application of the sense of hearing to the detection and diagnosis of disease. It was first employed by a celebrated French physician named Laënnec, and is now practised by all physicians and surgeons. A. may be either direct or indirect. It is said to be direct when the ear is applied to the chest, and indirect when an instrument for conducting sound, termed a stethoscope, is employed. A. is employed to detect (1) diseases of the lungs; (2) diseases of the heart; (3) aneurismal tumours; and (4) pregnancy. See ANEURISM; LUNGS, DISEASES OF; HEART, DISEASES OF; PREGNANCY; and UTERUS, DISEASES OF.

Ausonius, Decius Magnus, a Latin poet, born at Burdegala (Bordeaux) about 309 A.D. His father, a man of high social position, gave him an excellent education, in the carrying out of which his whole kindred, especially the female portion, deeply interested themselves. After practising at the bar of his native town, he became professor of rhetoric there, and acquired so high a reputation, that he was appointed tutor to Gratian, the son of the Emperor Valentinian. His discharge of his new duties must have been eminently satisfactory, for, to crown a long succession of honours, he was appointed consul by his grateful pupil (A.D. 379). On the decease of Gratian, A. withdrew to a rural retreat near Burdegala, where he died about 392 A.D. There has been much controversy as to his religious belief, but there can be little doubt that he was a Christian, though the author of the obscene *Cento Nuptialis* can hardly be considered an ornament of religion. His works, which are numerous, and in many styles, both prose and verse, consisting of epigrams, idyls, and epistles, are vitiated by bad taste, though his epigrams are sometimes expressed with much neatness. The *editio princeps* of A. appeared at Venice in 1472; the best is the *Variorum* of Tollius (Amst. 1671). There are French and German translations of his works.

Austen, Jane, an eminent English novelist, was born at Steventon, in Hampshire, of which her father was rector, 16th Dec. 1775. Her first four novels—*Sense and Sensibility* (1811), *Pride and Prejudice* (1813), *Mansfield Park* (1814), and *Emma* (1816)—were published anonymously. Her two posthumous ones, *Northanger Abbey* and *Persuasion* appeared in 1818. Few whose works are now so famous have been in life so obscure. While yet in the shade, however, her power was recognised by many men of widely-different intellect. Sir Walter Scott's generous encomium is too well known to require quotation. If her scope is limited, within her scope—and she never attempts to go beyond it—she is almost unrivalled. The shafts of her delicate yet piercing humour are never tipped with the venom of cynicism. Her characters unfold themselves by imperceptible touches; yet we end by knowing them as we know our most intimate acquaintance. The structure of her tales is beautifully simple, but conceived and carried out with perfect art. We have nothing violent, nothing tragical, nothing even painful. Her material is human nature—externally as it shows itself in the drawing-rooms of the well-educated, moderately-circumstanced classes of England; and developed by just such incident and such chat as are *everyday* in that sphere of life. She died at Winchester on 24th July 1817.

Austen, William, a celebrated English metal-worker and designer of the 15th c. His great work is the tomb of Richard de Beauchamp, Earl of Warwick, in St Mary's Church, Warwickshire.

Austerlitz, a town of Moravia, circle of Brünn, 45 miles N.N.W. of Vienna, celebrated in connection with the 'battle of the three emperors.' An alliance having been formed between Austria and Russia, with the intention of checking the fiery course of Napoleon, the troops of the two nations, headed respectively by Francis I. and Alexander I., encountered those of

France near A., December 2, 1805. The allies suffered a crushing defeat, losing some 30,000 men, 40 standards, and 150 pieces of cannon. The battle of A. led to the humiliating treaty of Presburg (December 27), by which Austria ceded Venice to France and the Tyrol to Bavaria. Pop. of A. (1870) 3452.

Austin, the capital of Texas, U.S., on the Colorado, about 200 miles from its mouth. It is picturesquely situated, and is accessible to steamboats during the winter floods. Its House of Legislature is a fine structure of native marble. Pop. (1870) 4428.

Austin, John, a celebrated writer on jurisprudence, was born 3d March 1790. When a boy he served for some years in the army. In 1818 he was called to the bar. He does not, however, seem to have had a physical constitution fitted for the fatigue of legal practice; on the other hand, his genius for what he himself called 'untying knots'—that is, legal ones—seems to have been of the highest order. In London he whetted this natural acumen by social intercourse with Jeremy Bentham, James Mill, and other great intellectual powers. He further improved himself by Continental travel and by study at Bonn, then the residence of Niebuhr, Schlegel, and other famous men. Returning to England, he published his *Practice of Jurisprudence Determined* (1832); an unquestionably great work, though unsuccessful in a commercial point of view. After holding some small temporary government appointments, he removed with his family to Germany, living at Carlsbad in summer, and at Dresden or Berlin in winter. The disturbances of 1848 drove him back to England. He then settled at Weybridge, where he died in December 1859. After his death, his lectures on jurisprudence were prepared for the press and published by his widow (with a memoir) under the title of *Lectures on Jurisprudence; being a Sequel to the Practice of Jurisprudence Determined* (1861-63). Probably no better work than this exists as a foundation for the philosophical study of law. Its author has eminently the faculty of clearing his mind from the mist of words, and of seizing a meaning even amid the fogs and clouds of legal phraseology. —**Mrs Sarah A.**, wife of the above, belonged to the family of the Taylors of Norwich, which has had many members distinguished in science and literature. Faithful and devoted to her husband when he was alive, his memory is largely indebted to her for the ability and zeal with which she has edited his lectures since his death. Mrs A. is also well known for her able translations of many celebrated French and German works. From the former she has given us Guizot's *English Revolution* (1850); from the latter, Ranke's *Popes of Rome*, and his *History of Germany during the Reformation*. She is also the author of several valuable original works on subjects of social interest. She died at Weybridge, 8th August 1867. —**Charles A.**, a brother of John A., the celebrated writer on jurisprudence, was for many years a leader of the parliamentary bar, and also known in private circles as a profound thinker of the Utilitarian school of philosophy. He might have reached the highest honours of his profession, having refused the offer of the solicitor-generalship. He died December 1874.

Australasia (literally, 'Southern Asia'), the geographical name given to that portion of Oceania comprising Papua or New Guinea, Australia, Tasmania, New Zealand, New Caledonia, New Britain, New Ireland, New Hebrides, and the Solomon Islands. The general term A. serves to distinguish the entire group from Polynesia Proper on the E., and from the Malayan or Indian Archipelago in the N.E.

Australia, an island, or, as it is now considered by many, a continent, bounded on the N. by the Arafura Sea and Torres Strait; on the E. by the Pacific Ocean; on the S. by Bass Strait and the Indian Ocean; and on the W. by the Indian Ocean. It extends from 10° to 39° S. lat., and from 113° to 154° E. long. Its extreme length, from E. to W., is 2550 miles; and its extreme breadth, from N. to S., 2000 miles. Its area is estimated at 2,967,500 sq. miles—equal to about three-fourths that of Europe. The coast-line of A. is remarkably devoid of large inlets, the only one of magnitude being the Gulf of Carpentaria on the N. and N.E., which has a depth on the eastern side of 500, and on the western side of 400 miles. Next in size, but at a very large interval, are Spencer Gulf and St Vincent Gulf, both on the S. coast of South A.; and Shark Bay, in Western A. The Great Australian Bight, to the N.W.

of Spencer Gulf, is only a curve in the coast-line. Harbours are exceedingly scarce in proportion to the extent of coast; and the N.E. coast is fenced in for 1200 miles by a series of coral-reefs known as the Great Barrier Reef. The estuaries are small.

A chain of mountains runs from the southern extremity of A. almost to its northern extremity at Cape York, though less continuous between 16° and 10° S. lat. The mountains composing this chain vary in distance from the coast from 20 to 100 miles. The southernmost portion is called the Australian Alps, and is the highest section of the great range. Its culminating peak is Mount Kosciuszko, so named by its discoverer, Count Strzelecki, who estimated its height at 6510 feet. A later measurement, however, shows its altitude to be 7308 feet. It is snow-capped almost all the year. Mount Karribogong, in the same range, is 6563 feet high. N. of the Australian Alps, the Blue Mountains (q. v.) extend for 150 miles. They are remarkable for their tremendous chasms, walled in by cliffs in some instances 1500 feet in height. For twenty-five years they formed an insuperable barrier to the spread of colonisation beyond them. A railway now runs over Mount Victoria, one of the loftiest peaks, the line reaching a maximum elevation of 3494 feet above the sea-level. The Blue Mountains are succeeded by the Liverpool Range (q. v.), whose highest peak is Mount M'Arthur, 5000 feet. The Liverpool Range is joined by the New England Range, whose height varies from 2000 to 5000 feet. Farther N., the great dividing chain receives a number of different names, and is less clearly defined. Expedition Range, which runs N.W. from the main chain, forms the watershed of Queensland. The Bellenden Kerr Mountains, in lat. 17° S., rise to the height of 5400 feet. The northern coast of A. is low. The western coast presents a series of straggling mountain ranges of no great altitude, save in the two cases of Mount Bruce, 3800 feet, and Mount Augustus, 3580 feet. In the south-western portion of the continent is the Darling Range, which has a maximum altitude of 3000 feet. The southern coast, from King George's Sound to Spencer Gulf, is a long plateau, faced for a great portion of the distance by sandstone cliffs from 300 to 400 feet in height.

The result of the mountains of A. being thus for the most part close to the coast, is that the largest rivers flow towards the interior. Their inferiority is the most marked defect in the physical geography of the country. Though several of them can last of a long course, they are all of very little service for commercial purposes. The largest is the Murray, which rises in the Australian Alps, and flows W. and N.W. till, some distance after entering the colony of South A., it makes a sudden bend, or 'elbow,' to the S., and empties its waters into the Indian Ocean through Lake Alexandrina. In its course it receives on the right bank the Murrumbidgee, with its tributary the Lachlan; and the Darling, with its affluents the Culgoa, Bokhara, Bogan, and Warrego. On the left bank it receives the Mitta-Mitta, Ovens, Goulburn, Campaspe, and Loddon. After its confluence with the Darling, the Murray receives no tributary of any size. Its total length is about 1500 miles, and the area of its basin is computed to be about 270,000 sq. miles. A fleet of light-draught steamers plies upon it, as well as upon the Darling and Murrumbidgee. The last is navigable in this way for 500 miles. Lake Alexandrina, into which the Murray debouches, is about 30 miles long by 27 broad, and quite shallow. This defect, coupled with the difficulty of the entrance from the sea, renders the Murray useless save as a means of internal communication. Of the other rivers named, the Darling drains an area of 198,000 sq. miles, and the Murrumbidgee an area of 57,000 sq. miles. The Lachlan is frequently a mere chain of pools, and flows into the Murrumbidgee through a vast morass. This is the character of most of the rivers flowing towards the interior of A.; and the Macquarie, for instance, losing itself in a marsh, which occasionally overflows into the Darling. On the other side of the dividing range the rivers are of a very different character. Their courses being for the most part short and the fall great, the rivers partake largely of the character of torrents; and only two, the Fitzroy and the Hawkesbury, can in any sense be regarded as navigable streams. The latter has been known to rise in flood 97 feet above its ordinary level. Proceeding from N. to S., the principal rivers on the E. coast are the Burdekin, Fitzroy, Burnett, Brisbane, Clarence, M'Leay, Hunter, Hawkesbury, Shoalhaven, and Snowy. On the S. coast the only rivers (exclusive of the Mur-

ray) deserving notice are the Yarra-Yarra and Glenelg. On the W. coast the chief are Swan River and the Murchison. These likewise are torrents. On the northern slope there are several large streams, the chief (from W. to E.) being the Alligator, Roper, Albert, Flinders, and Gilbert. The Roper has been ascended for 100 miles by a steamer of 600 tons register, and is a fine stream. The four rivers last named all flow into the Gulf of Carpentaria.

The coast-line of A. consists, as has been shown, in a very large measure of mountain slopes. The interior descends from fine upland downs to immense open plains, in nearly all places scantily watered, but still capable of depasturing vast numbers of sheep and cattle. In other parts, more especially towards the centre of the continent, along the Great Australian Bight, and for many miles inland from the latter, large tracts of desert exist. Low ranges of hills streak the heart of A., becoming fewer and less elevated towards the N. The extensive explorations made within the last five years have revealed the fact that a much larger portion of the interior of A. is suitable for pasturage than was formerly supposed. Since the construction of a line of telegraph (finished in 1872) across the continent from Adelaide to Port Darwin, and since the gold discoveries near the latter place led to an influx of population thither, stock have been driven across from both South A. proper and Queensland. Salt lakes and marshes are found in numerous places in the interior. The largest of these is Lake Torrens, which is shaped like a horseshoe, and its inner edge in time of flood measures some 400 miles. In this lake the Barcoo, a not inconsiderable stream, is absorbed. The clear portion of Lake Torrens, save in very dry weather, is from 15 to 20 miles in breadth.

The climate of a territory such as A., stretching over 29 degrees of latitude, is necessarily very diversified. One-third of the continent lies within the Tropic of Capricorn, and its climate is therefore tropical. Of the remaining two-thirds, the climate varies according to the usual conditions, and in the most southerly portion is very similar to that of the S. of France. The mean annual temperature of Melbourne (37° 48' S. lat.) is 53°, being about 7½ degrees higher than that of London. The mean annual temperature of Sydney (32° 52' S. lat.) is 65°. The annual rainfall at Melbourne is about 27 inches; at Sydney, 49 inches; at Brisbane, 51 inches; and at Adelaide, 21 inches. A. is subject to periods of excessive drought, which are most severe in the interior, and cause great losses among live stock. The heat during the third week of January 1875 was the greatest known for a number of years. At Melbourne Observatory, on the 20th, the thermometer stood at 111° in the shade, and 148° in the sun, being only one degree short of the excessive heat of January 1862, which, again, was the greatest known since 1858. During these droughts immense tracts of pastoral country and forest are destroyed by grass and bush fires. In the northern part of A., within the range of the monsoons, there is an annual rainy season, when the country is flooded for great distances. Taking A. as a whole, however, its greatest want is the want of water.

Geologically, the greater portion of A. is composed of Tertiary rocks, which form the whole, so far as is known, of the great central plateau and basin. The coast within the tropic on the W. and on the N. consists of Secondary strata. Between these and the central Tertiary beds is a belt of Plutonic and Metamorphic rocks, which is continued round the eastern, western, and part of the southern shores. On the E. it includes within it the greater portion of the main dividing range of mountains, though in places it is mingled with rocks exhibiting a stratified structure. On either side of this range is a wide strip of Palæozoic rocks, which unite in Central Victoria, and abound with mineral and metalliferous wealth. Excellent coal is found in abundance at Newcastle, at the mouth of the Hunter River, and is exported thence to all parts of Australasia, India, China, Japan, and the Pacific ports of N. and S. America. Good coal is also found on the Bulli River, New South Wales, and near Perth, in Western A. Many attempts have been made to discover paying seams of coal in Victoria, but without success. It is in metals, however, that A. is richest. The resemblance between the great mountain chain of A. and the Ural Mountains, led Sir Roderick Murchison to express the belief, in 1845, that gold would be found there. In 1851 his predictions were verified by the discovery of gold near Bathurst (q. v.), by Mr E. H.

Hargreaves, who had had gold-mining experience in California. In August of the same year gold was discovered at Ballarat (q. v.), and Clunes, in Victoria. During 1852 the gold export from Victoria reached its maximum, viz., £15,900,000. In the 'early days' of the gold discovery the working consisted for the most part in washing the gold out of the alluvium, but in course of time these surface-deposits became in a large measure exhausted. Recourse was then had to the extraction of the precious metal from the quartz rock in which it was embedded, and from this time forward quartz-mining steadily rose, and alluvial mining as steadily declined in importance. In 1874 the dividends paid by quartz-mining companies in Victoria amounted to £806,999, while the dividends paid by companies engaged in alluvial mining amounted to only £45,065, though, if the profits of unassociated enterprise were added to the latter, the disproportion would be considerably lessened. Quartz veins, or 'reefs,' are now remuneratively worked at a depth of nearly 1000 feet. The following shows the total export of gold from A. during 1874:—

Victoria,	£3,668,000
New South Wales,	1,083,000
Queensland,	500,000
South Australia (Northern Territory), say	50,000
Total,	£5,301,000

Other metals are plentiful in A. Copper has been exported from South A. since 1844, when the once-famous Burra-Burra mine was discovered. It is now also exported from Queensland, where some remarkably rich deposits have been found. One of these, discovered in 1874, yielded up to 98 per cent. of pure copper. There are also a good many copper mines in operation in New South Wales. The value of the copper exported from Australia in 1872 was £1,075,000, of which South A. produced £800,000 worth, Queensland, £195,000, and New South Wales, £80,000. Tin has been found over an enormous area in both New South Wales and Queensland, but these deposits are not so largely worked as those of copper. In 1872 New South Wales exported £49,000 worth of tin, and Queensland, £120,000 worth. Silver, lead, iron, manganese, zinc, quicksilver, and other metals have been found in different parts of A., but are not extensively worked. Opals have been found in Queensland, and diamonds are believed to exist in the same colony.

Pastoral operations are carried on upon a very large scale in A., wool being the staple product of the continent. The following figures show the declared value of wool exported from, and the area of land under agricultural cultivation in, each of the five colonies of the Australian continent in 1872:—

	Wool.	Acres under Cultivation.
Victoria,	£5,738,698	964,996
New South Wales,	3,342,900	454,615
South Australia,	1,617,589	1,164,846
Queensland,	1,173,565	62,491
Western Australia,	122,637	53,240
Total	£11,995,329	2,700,208

The following table shows the financial position in 1873 of each of the continental colonies, similar statistics relating to Tasmania and New Zealand being appended for convenience of comparison:—

NAME OF COLONY.	Estimated Population at close of 1873.	Revenue of 1874	Rate of Taxation per Head of Population.	Public Debt on 31st Dec. 1873.	Value of Imports for 1873.	Value of Exports for 1873.
Victoria, . .	790,492	£ 3,043,601	£ s. d. 2 4 10	18,445,788	16,533,856	15,398,454
N. S. Wal's., .	500,275	3,394,713	2 0 4	10,347,415	11,080,988	11,845,829
S. Australia, .	198,027	377,645	1 10 7	2,774,920	3,820,830	4,587,859
Queensland, .	146,690	1,120,734	4 0 2½	4,766,850	3,881,796	3,540,513
W. Australia, .	95,701	134,812	3 8 7	35,000	997,338	205,217
Tasmania,	1,721,475	9,460,918	2 14 6½	190,264,887	34,671,128	35,513,872
New Zealand,	104,217	293,753	2 0 0½	1,477,400	1,107,167	893,556
Total, . .	2,081,920	11,342,591	2 12 7	38,269,598	41,979,357	41,909,238

Further and more detailed statistics will be found under the names of the respective colonies.

The *Botany* of A. possesses some marked characteristics. The most striking specimens of the Australian flora are the trees belonging to the genus *Eucalyptus* (q. v.), of which there are fully 100 species. They produce timber of the very best quality, though exceedingly hard when mature. A number of them also yield a gum-resin, and are hence called 'gum trees' by the colonists. The leading varieties are *E. globulus* (blue gum), *E. gigantea* (stringy bark), *E. robusta* (red gum), and *E. amygdalina* (peppermint-tree). The two first sometimes attain a height of 300 feet, and the second an occasional girth of 60 or 70 feet. The acacias are even more numerous in Australia than the Eucalypti, though less striking. The members of the *Casuarina* family (q. v.) are valued for their wood, and are very remarkable objects in Australian forest scenery, while the *Banksias* (q. v.) supply the element of beauty which is lacking in the *Casuarina*. Ferns and heaths are abundant, and of many varieties. It is a noteworthy fact, in connection with the flora of Australia, that it is all evergreen, though some of the trees shed their bark instead of their leaves.

The *Zoology* of A. is as peculiar as its botany. Its most marked feature is the abundance of marsupials (q. v.), chief among which may be mentioned the kangaroo (q. v.), opossum (q. v.), bandicoot (q. v.), and wombat (q. v.). The Australian opossum belongs to the natural order *Phalangistide*, and must not be confounded with the true opossum of America, belonging to the natural order *Didelphide*. That extraordinary creature the *ornithoryncus* (q. v.) is confined to Australia. The dingo (q. v.), or native wild dog, is not a marsupial. See THYLACINE and DASYURE. The Australian bush abounds with birds of every description and the gayest plumage—cockatoos, paroquets, lorries, &c. The most remarkable are the emu (q. v.), lyre-bird (q. v.), and bower-bird (q. v.). The coasts and rivers abound with fish, some of which constitute excellent food. Fishing for the pearls contained in the shells of the pearl-oyster (*Avicula Margaritifera*) is extensively and very successfully carried on off the north-western and north-eastern coasts. See WESTERN AUSTRALIA.

The *aborigines* of A. belong to the Papuan, Austral-negro, or Melanesian race. They rank very low in the scale of humanity, and fast disappear when brought into contact with civilisation. There are 40,000 Chinese in A., half of them being in Victoria. Polynesians are being introduced into Queensland, and Malays into the Northern Territory (South A.).

The following is a summary of the main facts in Australian discovery and colonisation:—Cape York was sighted by the master of the Dutch vessel *Duyfhen* in March 1606. This is the earliest authenticated record of the discovery of A. by Europeans, though part of the north-western, the eastern, and part of the southern coasts are laid down in Portuguese charts dated 1542, and now in the British Museum. The Spaniard Torres passed through the strait which now bears his name later in 1606. The Dutch sailed along the western coast in 1616-18, and discovered Cape Leeuwin in 1622. In 1642 Tasman (q. v.) discovered the Island of Tasmania (q. v.), which he named Van Dieman's Land. Captain Cook in 1770 first sighted the south-eastern coast at Point Hicks, and explored the whole of the E. coast up to Cape York. In 1798, Bass, a navy surgeon, discovered Bass Strait, and Flinders traced the line of the southern coast in the same year. The first settlement was planted at Botany Bay (q. v.) in January 1788. The whole of A., together with Tasmania and New Zealand, was originally subject to New South Wales, but the various colonies became independent of the latter as follows:—Tasmania in 1825; Western A. in 1829; South A. in 1834; New Zealand in 1841; Victoria in 1851; and Queensland in 1859. Among the many men who have won fame in the arduous and perilous field of Australian exploration, the names of Hume, Sturt, Leichhardt, Oxley, Eyre, Burke, Wills, Stuart, Gregory, and Forrest are honourably distinguished.

Austra'sia, a Latinised form of the German *Oester-reich*, the name given in the time of the Merovingians to the East kingdom of the Franks, comprising Lorraine, Belgium, and the right bank of the Rhine, and separated from Neustria (the West kingdom) by the Vosges, the Forest of Ardennes, and the Mâas. Capital, Metz. Under Charlemagne it became the principal part of the Frankish empire, and under his successors, part of Germany. See Haguenin's *Histoire du Royaume Mérovingien d'Austrasie* (Paris, 1863).

Austria, Archduchy of, the hereditary dominions of the house of Austria, and nucleus of the empire, lies on both sides of the Danube, and extends from Bavaria on the W. to Hungary on the E. It consists of three crown-lands, or provinces of the empire—Lower and Upper Austria, on either side of the river Enns, and the duchy of Salzburg. The chief towns are Vienna, Wiener Neustadt, Salzburg, Linz, and Ischl. Area, 15,053 sq. miles; pop. (1869) 2,880,424. A. was originally a *Markgrafen-thum* or border earldom of the Frankish empire, and was established by Charlemagne as a barrier against the Avars of Hungary. In 1156 it was raised to a duchy, and in 1453 to its present dignity of an archduchy.

Austria, Empire of, also known since 1868 by the official name of the Austro-Hungarian Monarchy, is next to Russia the largest country in Europe. It is square and compact in form, and only approaches the sea in the S.W., where Dalmatia borders on the Adriatic Sea for about 108½ miles. Three great mountain chains traverse the empire in an almost continuous semicircle from its S.E. angle to the Swiss frontier; these are the Carpathians, Sudetes, and the Rætian and Noric Alps (q. v.). The Ortles Spitze, in the Tyrol, is by far the loftiest peak in A., rising to a height of 12,808 feet. In Hungary there are several large lakes, the most important being the Platten See, 382 sq. miles in extent, and Neusiedler See (Fertö-Cava), 117 sq. miles, both of which abound in fish. Several extensive plains occur, chiefly in the centre and S., the largest of which, the great plain of Hungary, has an area of 21,000 sq. miles. This plain is watered by the Danube (q. v.), which has a course in A. of 849 miles. The chief feeders of the Danube are the Inn, March, Raab, Waag, Neutra, Gran, Theiss, Drave, Save, Bega, and Temeş. Other rivers rising in A., though soon flowing out of it, are the Elbe, the Adige, Vistula, and Dniester. The climate is generally warm and healthy, but it necessarily varies much over so wide an area; the mean temperature is 10·5° C. at Vienna. The empire is divided into seventeen crown-lands, or administrative provinces, and a military frontier. The divisions, area, and population are as follows, according to the census of 31st December 1869:—

Crown-lands.	Area in Square Miles.	Pop. in 1869.
<i>German Monarchy:—</i>		
Lower Austria,	7,654	1,990,708
Upper Austria,	4,632	736,557
Salzburg,	2,767	151,159
Styria,	8,669	1,137,990
Carinthia,	4,005	337,094
Carniola,	3,856	466,334
Illyria, or coast districts,	3,084	600,525
Tyrol and Vorarlberg,	11,323	885,789
Bohemia,	20,060	5,140,544
Moravia,	8,583	2,017,274
Silesia,	1,987	573,352
Galicia,	30,308	5,444,689
Bukowina,	4,935	573,404
Dalmatia,	4,951	456,961
<i>Kingdom of Hungary:—</i>		
Hungary,	87,043	11,633,162
Transylvania,	21,216	2,115,024
Croatia and Slavonia,	8,041	1,168,037
Military Frontier,	7,841	593,232
Total,	240,955	35,904,435

The military frontier extends from Transylvania to the Adriatic, and forms part of the N. boundary of Turkey. According to the official returns of August 1874, the army of A., on the peace establishment, consists of 259,173 men, with a war contingent, raising it to 772,729. The navy comprised 47 steamers, with 87 light and 308 heavy guns. The pop. of A. is dense in the plains of the S. and N.W., but very sparse in the mountain regions. It embraces an immense variety of races, still preserving their peculiarities of feature and language. In 1870 there were 16,219,000 Slaves, the predominant race, embracing the northern Czechs, Ruthenes, and Poles, and the southern Slovaks, Serbs, Bulgarians, and Croats. Among other nationalities, the Germans numbered 9,040,000, the Magyars, or Hungarians proper, 5,431,000, the Rumanians, whose name tells us that their language is derived from that of ancient Rome, 3,456,000. There are also Gipsies, Jews, Armenians, and Russians. Of this mixed population 23,954,233 are Roman Catholics; 3,941,796 Greco-

Roman Catholics; 3,050,830 Greeks not in union with the Church of Rome; 3,570,989 Protestants; and 1,375,861 belong to the Jewish faith. There are 11 Roman Catholic archbishoprics, and 57 bishoprics; and there are about 300 abbeys, and over 500 convents in the empire. A. has seven universities (Vienna, Prague, Gratz, Innsbrück, Pesth, Cracow, and Lemberg), four of which are 'German' universities—that is, the lectures are delivered in the German language. In 1872 the University of Vienna had a staff of professors and teachers numbering 200, and 3881 students; Prague had 97 professors and 1709 students; Gratz, 70 professors and 926 students; Innsbrück, 58 professors and 612 students. There are also seven technical colleges, and many schools of science and art. The German system of education is modified here in some respects. There is a greater number of special or technical schools, and also of establishments where the pupils reside; and both preliminary and higher education is in great part provided by the communes and the state. As in Germany, attendance at the 'Volks-Schulen,' or National Schools, is compulsory.

The commerce of A. has been much retarded by the want of a sufficient means of communication. Its seaboard is not only barred off from the interior by high mountains, but the chief rivers flow into other countries before entering the sea. In late years, however, the facilities of transit have been greatly improved. The entire length of railways in 1874 was 9583 miles, and some 4213 miles were being laid down. In the same year there were 27,408 miles of telegraph lines. Not less than 20,000 miles of highways have been constructed in the present century, the most remarkable of which are those over the Stelvio Pass, the Splügen, and the Semmering. Since the introduction of steam the river navigation has greatly increased, the annual receipts of the Austrian Danube Steam Company alone amounting to over £700,000. Except in Dalmatia, which is an isolated district, all customs boundaries within the empire have been abolished. The removal of these impediments has acted most beneficially on the commerce of A., which is for the most part internal, having its headquarters at Vienna, Linz, Prague, Lemberg, Pesth, Gratz, and Brody. The chief imports are raw cotton, yarns, woollen goods, silk, sugar, dye-stuffs, and olive-oil; exports, corn, flour, cotton, and silk goods. Machinery and instruments were exported to the value of £1,146,425 in 1874. The entire imports of merchandise in 1874 amounted to £56,561,588, and of bullion £1,934,926; exports, merchandise, £45,225,710, bullion, £1,952,893.

Fully three-fourths of A. is mountainous, but the soil is fertile in many of the provinces; and including pasture and forest, more than five-sixths of the entire surface is productive. Although agriculture is still in a backward state, grain of all kinds is abundantly produced in Hungary, Bohemia, Moravia, Galicia, Silesia, and in other parts. In the mountain districts the products resemble those of Britain, and in the S. maize, millet, and mulberries are cultivated. In the Banat rice is grown; tobacco is largely raised in Hungary; Bohemia yields excellent hops; and in Dalmatia oranges and lemons are produced. The vine is cultivated in nearly all the provinces; and the wine of Hungary, called Tokay, is equal to the finest wine of France. About 400 million gallons are produced annually, but only a small quantity is exported.

In minerals A. is as rich as any country in Europe, its produce amounting to about £9,000,000 annually. For many centuries mining has been a principal occupation, and has been fostered by the state. Gold is found in largest quantity in Transylvania and silver in Hungary; quicksilver occurs in both these provinces, as also in Styria and Carinthia. Cracow and Carinthia are most productive of zinc, and iron and copper are got in various provinces. Carinthia also contains extensive lead-mines. Tin is confined to Bohemia, and Hungary alone yields antimony. A considerable quantity of graphite, arsenic, and petroleum is also found. There is abundance of good marble and fine porcelain earth. The precious stones of A. are numerous, the most valuable being the Hungarian opal and Bohemian garnets. There are, besides, cornelians, agates, beryl, jasper, amethyst, topaz, ruby, and sapphire. Immense deposits of coal exist, chiefly in Moravia and Bohemia, but this branch of mining is not yet much developed. Rock-salt abounds in Galicia, Transylvania, and Hungary, and there are large salt-works in the Tyrol and on the Adriatic coasts, some of which are carried on by the state. There are over 1600

mineral springs in A., many of which are noted, as those of Baden in Lower Austria.

Many of the animals of A. are becoming rare, but in the Alps, Carpathians, and Dalmatia, brown bears, wolves, jackals, and lynxes, are still plentiful, and the chamois is sometimes found. The culture of silk is extensively carried on, chiefly in the Tyrol, and it results in the annual produce of about 300,000 silk cocoons. Domestic animals are extensively reared in many parts of the monarchy. The state promotes horse-breeding by the establishment of 'military studs,' and also encourages the breeding of sheep. Bohemia, Hungary, and Moravia yield the finest fleeces.

The manufacturing industry of A. is making rapid progress. In 1866 the imports amounted to £21,138,215; in 1874 to £56,561,588; while the exports within the same period had increased from £32,622,530 to £45,225,710. The chief manufactures are silks, woollens, cottons, linen, twist, and iron goods. Bohemia is famous for its glass wares, and Vienna is the central market for articles of luxury. The state has a monopoly of the manufacture of tobacco, yielding nearly £6,000,000 annually. The chief seaports are Trieste, Rovigno, Fiume, Zara, Ragusa, Cattaro, Spalatro, and Buccari.

The form of government is a monarchy, secured in the Hapsburg-Lothringen dynasty, and the states of Bohemia and Hungary have the right to appoint a new king in the event of the reigning house expiring. For the other parts of the empire the last sovereign can choose his successor, who must, however, be a Roman Catholic. Since 17th February 1867, the empire has been dualistic in form, embracing a German or *Cisleithan* state, called A. proper, and the Magyar or *Transleithan* kingdom of Hungary. These two divisions have distinct laws, and separate parliaments and governments, but are united in a common parliament of 120 members, to which each returns an equal number of representatives. This body of Delegations, as it is called, exercises jurisdiction chiefly over foreign affairs, war, finance, and such other matters as affect the welfare of the whole monarchy. The parliament of A. proper, called the Reichsrath (at Vienna), consists of an upper house of 175 members, and a lower house of 203. That of Hungary is the Reichstag (at Pesth), which has 410 higher and 438 lower representatives, and the ministry of which is responsible to the emperor.

As to finance, since the beginning of the present century the credit of A. has been more or less depreciated owing to the costly wars in which the country has been engaged. There are three distinct budgets, as there are three parliaments—viz., the Reichsrath, Reichstag, and Delegations—and in 1874 the total revenue was £70,566,059, and the expenditure £75,403,459. The entire debt of this monarchy in 1874 was £333,926,906.

The land forming the present Archduchy of A. (q. v.) was occupied in the earliest times by the Taurisci, who belonged to the Celtic family, who subsequently disappeared before the Norici. In B.C. 14 the Norici were conquered by the Romans, who took possession of the land up to the Danube; while the region north of that river up to the Bohemian and Moravian borders formed part of the territory of the Marcomanni and Quadi. A part of Lower Austria and Styria, with Carinthia and part of Carniola, belonged to the Roman *municipium* of Vindobona (Vienna), the capital of Pannonia. Görz was part of the Roman province of Illyricum, and Tyrol of Rhetia. But the irruptions of the barbarians obliterated these boundaries. During the 5th and 6th centuries, Boii, Vandals, Heruli, Rugii, Goths, Huns, Longobards, and Avars dwelt in turn in the broad basin of the Danube; but after 568, when the Longobards had pushed on into Italy, the river Ens formed the boundary between the German Bajuvarii (Bavarians) on the W. and the Avars on the E. Along the Mur, the Save, and the Drave, Slaves began to appear in the beginning of the 7th c. After the abolition of the ducal dignity in Bavaria by Charlemagne (788), the Avars pushed across the Ens into the Bavarian (now Frankish) territory, and their raids brought down upon them the heavy hand of the great Emperor, who in 791 hurled them back to the Raab, and united the conquered territory (from the Ens E. to the confluence of the Raab with the Danube) with the Frankish empire, under the title of the Avaric or East Mark (*Marchia Orientalis*, or *Austria*). Charlemagne sent German colonists, chiefly Bavarians, into the new province, over which he set a *Markgraf* or border earl, while the Archbishop of Salzburg had the superintendence of all ecclesiastical matters. After the treaty of Verdun (843), which broke up the huge Frankish empire of Charlemagne into France

and Germany, A. formed the eastern frontier of the German empire. But now a new Turanian race, the Magyars or Hungarians, appeared on the scene, who repeated the incursions of the vanished Avars, and about 900 made themselves masters of the East Mark, which was first recovered to Germany by the Emperor Otho I., after the bloody fight at Augsburg in 955.

In 983 the Emperor appointed Leopold of Babenberg markgraf of A. He is memorable for his successful enterprises against the Magyars. During the rule of his son, Heinrich I. (994-1018), the name *Ostirrichi* (i.e., Eastern kingdom) first appears in a document of the Emperor Otho III., of date 996. His nephew Ernst (1050-75) was a favourite of the Emperor Heinrich IV., who called him 'the foremost and the truest prince of the empire,' and his land 'the bulwark of the empire.' In 1156 A. was raised to a duchy, declared to be indivisible, with the government hereditary in the eldest son of the Babenberg line, and not a fief of the empire, though subject to the laws of the empire. In 1246 the Babenberg line became extinct, through the death of Friedrich, 'the Quarrelsome,' in battle with the Magyars. From 1246 to 1282 there was what may be called an *interregnum* marked by much confusion, the result of conflicting ambitions; but at last Ottokar, son of the king of Bohemia, was chosen by the states of the duchy, and might have established his dynasty had he not refused to acknowledge the election of Rudolf of Hapsburg as Emperor of Germany, with whom he rashly involved himself in strife. He was slain at a battle on the Marchfeld, 26th August 1278, and in 1282 the emperor invested his own sons Albrecht and Rudolf with the hereditary possession of the duchies of A., Styria, and Carinthia.

With the Hapsburg dynasty, which continues to this day, the greatness of A. began. It is not necessary to go over the history of the Hapsburgs while they remained merely dukes of A. Albrecht left five sons, one of whom, Friedrich the Fair, was elected Emperor of Germany in 1314, but was forced to yield to a rival, Ludwig of Bavaria, in little more than a year. Another of the brothers, Albrecht II. (died 1358), greatly increased the family possessions by marriage, obtaining among others the Burgundo-Kyburg lands in 1326. Of his four sons, Albrecht III. and Leopold are the most notable. The latter, who founded the Styrian line, lost his life fighting against the Swiss at Sempach (1386). On the death of Albrecht III. (1395) additional possessions were acquired by A. In 1404 Albrecht V. married the daughter of the Emperor Sigismund, by which he acquired Bohemia and Hungary, and, as Albrecht II., became German emperor. The marriage of Maximilian I., in 1477, to Maria, daughter of Charles the Bold, secured to the house of Hapsburg the possession of the Netherlands. Spain also became an Austrian possession (1496) by the marriage of Philip, son of Maximilian. Philip's son was Carlos I. of Spain, who became German emperor, under the title of Karl V., on the death of Maximilian I. in 1519. All the German hereditary possessions, except the Netherlands, were given up by Charles to his brother, Ferdinand I. (q. v.), who in 1556 succeeded him in the imperial dignity. By his marriage with Anna, sister of the Hungarian King Louis II., who fell at the battle of Mohacz in 1526, Ferdinand secured to A. the kingdoms of Hungary and Bohemia, together with Moravia, Silesia, and Lausitz, which were subject to Bohemia. On the death of Ferdinand in 1564, the Austrian possessions were divided between his three sons, and not again united till 1619, under Ferdinand II. (q. v.). The attempt of Bohemia at this time to place the Elector Palatine, Friedrich V., leader of the Protestant union, on the throne, plunged the country into the Thirty Years' War (q. v.). By this war, the most tedious and terrible in the annals of A., the population of Bohemia was reduced from 3,000,000 to 780,000. It was soon after followed (1701-13) by the Spanish War of Succession (q. v.), arising out of a struggle between Leopold II. and Louis XIV. of France for the Spanish crown. By the peace of Utrecht (1713), concluded during the reign of Karl VI., the Netherlands, Milan, Mantua, Naples, and Sicily were secured to A.; but the latter two of these possessions were surrendered to Don Carlos of Spain in 1737. On the demise of Karl VI., the male line of the Hapsburgs had died out, and the heirship to the throne was claimed by his daughter, Maria Theresia (q. v.), wife of Franz Stephan, Duke of Lorraine. See PRAGMATIC SANCTION. A fierce war ensued, in which Maria had only England as an ally, but her government was finally secured. Silesia, however, was conquered by Friedrich II. of Prussia, and

subsequently a vigorous but unsuccessful attempt was made to recover it in the Seven Years' War (q. v.). The first partition of Poland (1772) added Galicia and Lodomeria to A.; and in 1777 Bukowina was ceded by the Sultan. The political changes begun by the empress were vigorously extended after her death (1780) by her son, Joseph II. He enacted many beneficial reforms, but his inconsiderate zeal stirred up rebellion in various parts of the empire. Joseph II. died in 1790, and was succeeded by his brother, Leopold II., Emperor of Germany, whose brief reign was marked by an alliance with Prussia against France, to which he was prompted by the fate of his sister, Marie Antoinette. In 1792 he was succeeded by his son, Franz II., against whom France declared war in the same year. A. was deprived of Lombardy and the Netherlands by the peace of Campo Formio (q. v.), receiving instead the Venetian territory. By the second partition of Poland (1799) it acquired W. Galicia. The war with France was resumed in 1799 by A. in alliance with Russia, and ended in the peace of Luneville. A. lost 42,000 sq. miles of territory by the peace of Vienna in 1809, but for this compensation was given by the treaty of Paris (1814). In 1804 Franz proclaimed himself hereditary emperor of A., with the title of Franz I., and two years later gave up the dignity of German emperor, held by the Hapsburgs for five centuries. In 1832 Franz I. died, and left to his son, Ferdinand I., the task of carrying on an oppressive system of bureaucratic government, under which the nation was already growing restless. The French revolution of 1848 was followed by an outbreak in Lombardy, Venice, Hungary, and A. proper. For a time the revolution was successful. Hungary was declared independent; the royal troops were driven from Italy; Vienna was held by the insurgents; Venice threw in its lot with Sardinia; everywhere A. seemed breaking into pieces. After a time, however, the government, which had been surprised, began to grapple with the danger. Ferdinand I. abdicated (December 2, 1848) in favour of his nephew, Franz Joseph (q. v.). In 1849 a liberal constitution was proclaimed, new ministers were appointed, and some degree of satisfaction was restored among the more moderate parties. The army in Italy was reinforced, and, under the command of Radetzky (q. v.), soon regained possession of the country. The struggle still raged fiercely in Hungary; but aid was procured from Russia, and the rebellion was ultimately stamped out by overwhelming numbers. The Hungarian army, 25,000 strong, under Görgei (q. v.), surrendered to the Russians on the 13th August 1849. Before the end of the same year the Emperor of A. resumed his original power, the liberal constitution to which he had consented under pressure was revoked on January 1, 1852, and the ministers of Hungary and of the other provinces were declared responsible to the emperor alone. The old despotic system of government was reinstated, and the policy pursued towards Italy was insidious and threatening. Alarmed at the dangers by which she was environed, Sardinia began to prepare for war (1859). A. demanded her instant disarmament, and, on this being refused, crossed the Ticino (April 29, 1859) and began hostilities. France, as the ally of Sardinia, declared war on A. (3d May), and the Emperor Napoleon III. led the troops in person. In every engagement A. was beaten, and a treaty was finally concluded at Zurich by which Lombardy was ceded to Sardinia, and A. retained Venetia. Meanwhile between A. and Prussia the struggle which had been carried on for so many years for the leadership of the German Confederation began to assume a threatening aspect. An opportunity for deciding the question of supremacy was all that was wanted, and this was readily found in the disposition of the Danish territory. See SLESVIG. In June 1866 war was declared against A. by Prussia in alliance with Italy, and in less than a month the decisive battle of Sadowa (q. v.) brought about a peace (signed 23d August), by which A. ceded Venetia to Italy. Since the close of the war, however, A., though excluded from the German Confederation, has enjoyed prosperity and peace, and has only been temporarily disturbed by the political demands of the Slavic nationalities. The bipartite constitution of 1867 recognised the autonomy of the Magyar kingdom, which has since had a separate parliament, and laws and ministers of its own. The welfare of A. was still further promoted by the abolition in 1870 of the concordat entered into with Rome in 1855, and the consequent withdrawal of the Papal nuncio. See the general histories of Malilath, Lichnowsky, and those of Büdinger (from the 13th c. to 1858), Springer (1803 to 65), Helfert (1848 to 69), and the *Archiv für Osterr. Geschichte* (vols.

i.-xliv. 1848-71), also F. Schmitt's *Statistik des Oesterreichischen Kaiserstaats* (Wien, 1873).

Auteuil, a *quartier* of Paris, formerly a village, at the entrance to the Bois de Boulogne, and within the fortifications. From the days of Molière it has been a favourite residence of authors.

Authentic (Gr. *authentikos*, vouched for), a term applied to a writing the contents of which are true, and thus opposed to that which is false. A distinction has been made by biblical scholars between *A.* and *genuine*: the former implying that the statements made are true and authoritative; the latter, that the book has been written by the person whose name it bears. The distinction is arbitrary.

Autocracy (Gr. *autokratia*, lit. self-mastery, but used even in classical times to denote absolute or arbitrary power), the name given to that form of government in which the sovereign is absolute. Among European potentates the Emperor of Russia alone is styled autocrat, his authority being subjected to no constitutional control. In the Kantean philosophy *A.* is used in its primary sense of *self-mastery*, i.e., the subjection of a man's lower nature to his reason.

Auto da Fé (Port. 'act of faith;') the Spanish form is *Auto de Fe*, the public reading of the sentences pronounced by the Inquisition on heretics, at which the culprits themselves were present; if absent or dead, they were represented by their effigies or bones. When an execution was to take place, a procession was held, generally on a Sunday between Whitsunday and Advent, the Dominicans leading with the flag of the Inquisition, the condemned following, and ecclesiastics bringing up the rear. A blow on the breast from an officer of the Inquisition gave the condemned over to the secular arm, and in a few hours afterwards the sentence was carried into effect. On May 21, 1559, thirty-one persons were burnt at Valladolid, and twenty-four at Seville on 24th September following. The last *A.* is said to have taken place about the middle of the 18th c. Napoleon abolished the tribunal in 1808; its suppression was confirmed by the Cortes in 1813; it was reinstated in 1814 by Ferdinand VII., and again abolished in 1820; yet in 1826 a schoolmaster named Ripoll was executed at Valencia, on a charge of Deism, under the forms of an *A.*

Autograph (Gr. *autographon*, what is written with one's own hand, and so the opposite of *apographon*, or copy), at first denoted a writing of any kind, any MS. executed by the author himself, but about the middle of the 18th c. came to acquire its present restricted meaning. The passion for collections of autographs arose in France about the end of the 16th c., and the earliest great collection was made by Loménie de Brienne (died 1638). From France it spread to England, and thence to Germany in the 18th c. The autographs of eminent individuals are now articles of commerce, their value depending on their scarcity, and on the eminence of the writers. The interest attaching to them is personal, there being an impression that character is indicated by penmanship. But this is true only to a certain extent, for the hand of the scholar is frequently fashioned in imitation of his teacher's. From Richard II. downwards, there is an unbroken series of autographs of the sovereigns of England, of which facsimiles were given by John Gough Nichols in a work in folio (Lond. 1829). France and Germany are particularly rich in collections of autographs.

Autolycus, a Greek astronomer, born at Pitane, in Æolia, and flourished about the middle of the 4th c., author of treatises on the revolving spheres, and on the rising and setting of the fixed stars, printed at Strasbourg in 1572. They show that *A.* was ignorant of spherical trigonometry.

Automaton (Gr. *autos*, self, and *maō*, to move, or rather to strive after, as if possessing volition), a machine so contrived as to imitate the actions of animals. There are many records of such in past times, as the flying pigeon of Archytas of Tarentum, the speaking head of Albertus Magnus, the flying eagle of Regiomontanus, and others, but their existence is not supported by satisfactory evidence. During the 18th c., however, Vaucanson, a Frenchman, exhibited several ingenious automata, a flute-player, a flageolet-player, and a most perfect imitation in form and behaviour of a duck. In 1809 Maelzel produced a trumpeter, which played a selection of French and Austrian tunes

and marches. The chess-player of Kempelen, long regarded as the most perfect of automata, is now a solved mystery, a crippled Russian officer having been hid in the interior. In 1845 Mr Clark of Bridgewater exhibited an *A.* Latin versifier, which he himself described as 'neither more nor less than a practical illustration of the law of evolution.' Besides these, there have been numerous other ingenious, but almost useless, contrivances imitating more or less the action of living animals. Of more practical inventions may be mentioned calculating machines, and automata for setting up type.

Autonomy (Gr. *autonomia*, self-government, or rather self-legislation) is the condition of a state or corporation which legislates for itself, and manages its own government. In the Kantean ethics *A.* denotes the sovereignty of the pure reason, when a man is a law to himself, and thus enjoys perfect liberty.

Autumnal Fever, a name given in some parts of America to enteric or typhoid fever. It is sometimes also called *Fall fever*. Both of these terms indicate the fact that this fever is usually most prevalent in autumn, or the fall of the year. See ENTERIC FEVER, TYPHOID FEVER.

Autun, a town in the department of Saône-et-Loire (Burgundy), France, on the Feron, 179 miles S.E. of Paris. It is the seat of a bishop, and has a cathedral of the 11th and 12th centuries. Talleyrand among others was bishop of *A.* Its manufactures are serge, carpets, cotton-velvet, leather, and paper. *A.* is the ancient Bibracte, the capital of the Ædui, and was made a Roman colony under Augustus, and named Augustodunum, of which its present name is an abbreviation. In 731 the Saracens burned it, and in 888 it was partly destroyed by the Normans. The town contains many Roman remains. Pop. (1872) 9729.

Auvergne, a former province of France, nearly corresponding to the modern departments of Cantal and Puy-de-Dôme (q. v.). It is a mountainous region, diversified with valleys fruitful in corn and wine, and is watered by the Allier and Dordogne, and their numerous branches. The hills are of volcanic origin, and are rich in iron, lead, copper, antimony, coal, and mineral springs. Some of the chief heights are Cantal (6093), Mont-d'Or (6188), and Puy-de-Dôme (4806). The name *A.* is derived from the Arverni ('Highlanders;') Celt. *Ar Fuarann*, the high country, who under Vercingetorix stubbornly defended their rugged fastnesses against Cæsar, but were finally blent with the Frankish conquerors of Gaul. The modern Auvergnese furnish Paris with industrious and honest workmen, as the Highlands of Scotland do Glasgow and Edinburgh.

Auxerre (anc. *Autissiodorum*), capital of the department of Yonne, France, on the river Yonne, 90 miles S.E. of Paris by rail. The district, of which the atmosphere is very salubrious, produces much wine. The cathedral of St Etienne, the choir of which dates from 1216, is in the Flamboyant style, and has fine windows of stained glass, of the 13th c. Its crypt, as well as that of the church of St Germain, is much admired. A boulevard surrounds the town on three sides. It has excellent educational institutions, and a valuable public library. The chief trade is in wine, but there are manufactures of woollen cloths, hosiery, earthenware, and leather, and timber and charcoal are exported. *A.* gives its name to a light Burgundy wine. Pop. (1872) 12,919.

Auxiliary Screw. See SCREW PROPELLER.

Auxiliary Verbs. See VERBS.

Av'a or **Kava**, the name given by the Polynesians to the root or rhizome of *Macropiper methysticum*, formerly called *Piper methysticum*, a plant belonging to the order Piperacæ. It has narcotic properties, and is used in cases of rheumatism and other complaints. An intoxicating beverage is also prepared from it, which the natives partake of before engaging in any religious rite. It is largely drunk in Fiji, and when taken in excess produces various skin diseases. Another beverage of a similar kind is prepared from a different plant, which, according to Dr Seemann, has the flavour of soap-suds combined with jalap and magnesia. The approved method of preparing *A.* is to chew the root, and thus extract the juice. It has a soothing effect when partaken of in the raw state, but when fermented it becomes in-

toxicating. A. leaves are, in some of the South Sea Islands, chewed with the arca-nut, in place of those of the betel-pepper. See **ARECA** and **BETEL**.

Ava, like Amarapura (q. v.), is only the ruin of what was several times the capital of Burmah, and stands on the Irawaddy, opposite the once famous city of Tsah-gyne. It consisted of an inner and outer city, both strongly fortified, and was built at a bend of the river, being surrounded on the land side by a deep ditch or fosse. Crumbling walls, ruined pagodas, desolate streets lined with grand old tamarind and mango trees, are all that is now, however, left of what was long the capital of Burmah in its palmy days.

Avaniches are large masses of snow or ice which are precipitated from high mountains into the valleys beneath. There are four kinds distinguished: *Drift A.*, produced by the action of the wind on snow rendered loose and powdery by the frost; *Rolling A.*, when a detached piece of snow rolls down the steep, gaining in size and impetus as it descends; *Sliding A.*, when gravity overcomes the force of adhesion, and the mass slides down the incline like a landslide; *Glacial A.*, when masses of frozen snow and ice are loosened by the heat of summer, and precipitated into the plains below.

Avall'on, a town in the department of Yonne, France, on the river Cousin, 26 miles S.E. of Auxerre, with a curious old church. The district produces corn and wine, and has rich pasture grounds. There are paper and woollen manufactures, distilleries and tanneries. A., the Gallic *Aballo*, a city of the Aldui, suffered frequently from sack and pillage from the 8th to the 16th c. Pop. (1872) 5029.

Avanturine, a variety of quartz found in different parts of Europe and Asia, and much used in the manufacture of imitation gems. It reflects light with great brilliancy.

Avarti, a people of Eastern origin, belonging probably to the Uralo-Altaian branch of the Turanian family, and allied to Huns and Magyars. They first appear in the regions north of the Caucasus, between the Don and the Caspian Sea. About the middle of the 6th c. they settled in Dacia, helped the Longobards to destroy the kingdom of the Gepidæ, and by the close of the same century had made themselves masters of Pannonia. Still later they conquered Dalmatia, made destructive forays as far W. as Thuringia, and even penetrated into Italy. The Slavic nations N. and S. of the Danube were for a time compelled to acknowledge their authority, but in 640 A.D. the A. were driven out of Dalmatia. Subdued by Charlemagne in 796, soon after completely crushed by the Moravians, they vanish from history early in the 9th c. The A. of the Caucasus, a people of Lesghian stock, are in no way related to the ancient A. of Pannonia.

Avast, a nautical term, used on board ship to express an order or command, generally a command to stop the particular operation going on at the moment, e.g., 'avast heaving;' but it also enters into the phraseology of seamen in many ways for which it is not easy to find an equivalent in ordinary English, e.g., 'avast there,' either 'hold your tongue,' or 'get out of the way.'

Avatar, a Sanscrit word used to denote the 'descent' of a Hindu deity on earth in some visible form, and therefore conveying a similar idea to what is expressed by the term *incarnation* in Christian theology. Its rhetorical use in English is inaccurate. The sudden appearance of a great thinker, statesman, priest, or warrior, is *not* an A.

Avatch'a, a spacious bay on the E. coast of Kamchatka, into which flow the rivers A. and Paratounka. The city of Petropaulovsk lies on the bay, and 20 miles N. there is a volcanic mountain called A., 9055 feet high.

Avebury, or **Ab'ury**, a village of Wiltshire, on the Kennet, a small branch of the Thames, 25 miles N. of Salisbury, is notable for possessing the largest stone circle in Europe. This circle, popularly assumed to have been a Druidical temple, consists of one hundred large blocks of stone, placed on end, forming a circle 470 yards in diameter. It is bounded by a deep ditch and an embankment, and encloses two small circles of similar character. The stones are oblong in shape, from 5

to 20 feet high, and from 3 to 12 thick. This ancient work is approached by two avenues, each upwards of a mile long, and defined by a double range of stones similar to those of the temple itself. Although it has long been the belief that these stone-circles were associated with Druidical worship, there is a lack of evidence to warrant any positive belief on the point. The first to broach the 'Druidical' theory was Dr Stukeley in his *Stonehenge and Avebury, Two Temples restored to the British Druids* (1740). In the neighbourhood of A. there are many curious barrows, cromlechs, and other monuments of antiquity.

Aveiro, or **Bragança Novo**, a seaport in the province of Beira, Portugal, 33 miles S. of Oporto, on a lagoon at the mouth of the Vouga. It was a famous trading place in the 16th c., is still the seat of a bishop, and has some trade in oil, wine, sea-salt, and oranges; but its situation is unhealthy. Pop. 4600.

Avella, the *Malifera Abilla* of Virgil, so called from the abundance of its apples, an ancient Italian town in the province of Avellino, 20 miles E.N.E. of Naples, with many remains of antiquity. Pop. of commune, 5228.

Avellino, the capital of a province of the same name in S. Italy, lies at the base of Monte Vergine, on which stands the monastery founded 1119, by St Guglielmo da Vercelli, on the site of a temple of Cybele. Its chief manufactures are woollens, paper, and macaroni; and it has some trade in corn and hazelnuts. A. was visited by earthquakes in 1694, 1731, and 1805. Near it is the Val de Gargano, where, in 320 B.C., the Samnites captured an entire Roman army. The old *Abellinum*, a town of the Iiispini, a Samnite people, lay at a little distance from the present town, but was destroyed by the Lombards. Pop. 13,446.

Ave Mari'a, the commencement of an invocation to the Virgin Mary, used by Roman Catholics, and taken from the salutation of Gabriel (Luke i. 28). It was enlarged by Urban IV. in 1261, and the form now in use was completed and sanctioned by Pius V. in 1508. The A. M. is generally recited after the Pater Noster. The name A. M. is applied, in Italy, to the ringing of bells about half an hour after sunset as a summons to prayer, though it is elsewhere also termed Angelus. Readers of Byro's *Don Juan* will remember the exquisite use of this application of the term (canto 3, st. cii.-ciii.). The small beads of the rosary are termed Ave Marias, because by these the Aves are reckoned.

Ave'na, a genus of grasses. See **OAT**.

Avenger of Blood. See **BLOOD**, **AVENGER OF**.

Avens, the common name for *Geum* (q. v.).

Aventinus, **Johannes**, a German historian, was born at Abensberg, Bavaria, in 1466. His proper name was Thurmair or Turmair, but he is better known as *Aventinus* from his birth-place, the Aventinum of the Romans. A. studied first at Ingolstadt, and then at Paris, where he graduated; taught publicly at Cracow and Vienna, and in 1512 became tutor to the son of the Duke of Bavaria. From the first edition of his *Annales Bojorum* (History of Bavaria), published in 1554 (later ed. 1710), twenty years after his death, the editor Ziegler had excised numerous passages depreciatory of the Church of Rome, which were restored by Cisner in 1580. A. wrote also the *Chronicon Bavarie* (1522), and a life of the Emperor Henry IV., now very rare. He died at Regensburg, January 9, 1534. See the Biographies of Wiedemann (Freising, 1858) and Dittmar (Nördl. 1862).

Average is a quantity intermediate to other quantities, so that the sum total of its excesses above those which are less, is the same as the sum total of its defects from those which are greater, and is found by dividing the *sum* of the quantities by the *number* of quantities.

Average, in maritime contracts and in insurance has several meanings. It means the compensation due by the underwriter when there is a partial loss of anything insured, as when goods are partly lost or injured. This is called 'Particular A.' When the captain of a ship throws goods overboard under distress, this loss is brought into what is called 'General A.:' that is, the loss is allotted proportionally to all concerned in ship, freight,

or cargo. The insurer of each owner, if he have any, must compensate him. 'Particular A.' is the term applied to the liability which the underwriters come under on specified articles. The term is plainly an incorrect one. The allotment of such expense as extra wages, pilotage, is called 'Petty A.' 'Average bond' is a deed which those liable to General A. usually execute, to empower an arbiter to value and allot the loss.

AVERNUS (Gr. *Aornos*), now Lago d'Averno, a small circular lake in the crater of an extinct volcano, about a mile and a half in circumference. It lies between Cumæ, Puteoli, and Baiæ, and was said to give off mephitic vapours destructive of animal life. Hence probably its Greek name, which signifies 'without birds.' Homer makes it the entrance to the lower world, and here were placed the grove of Hecate and the grotto of the Cumæan sybil.

AVERHOËS, or **AVERROËS**, a Græcised or Latinised form of the Arabic *Aben- or Ibn-Roshd*, is the name of an illustrious Moorish physician and philosopher, born at Cordova, according to El Ansari, in 1120. He belonged to a very good family of Andalusia. His grandfather, Abul-Walid-Mohammed Ibn-Roshd, the Cadi of Cordova, was a distinguished jurisconsult, and A. resolved to follow the same profession. He studied theology, jurisprudence, medicine, and philosophy under the best masters, and was intimate with men who were the leaders of scientific thought in Spain in the 12th c. Meanwhile great political changes were taking place in the country. The dynasty of the Almoravides (q. v.) was, in 1130, violently replaced by that of the Almohades (q. v.), and a new impetus was given to literature and science. The Sultan Yusuf (1163-84) was a great friend of A., and conferred on him high honours; but his successor, Al Mansur (1184-99), though for a time extremely friendly, was essentially a religious fanatic, and finally lent his ear to the groundless accusations of a malignant orthodoxy. A. was banished from Cordova, and died at Morocco 12th December 1198. It is difficult to understand in what his heresy consisted. As told by the Arab historians, it is enveloped in vague and puerile circumstantialities, but according to Ibn-Abi-Oceibia, the real cause was the hatred of the Mohammedan priesthood to the culture of philosophy and the study of the ancients. This is somewhat confirmed by the fact that A. did not suffer alone. A general persecution raged; everywhere philosophers, physicians, poets, &c., were in danger, and before the close of the century the light of scientific genius in Southern Spain had gone out. A.'s writings are numerous, and embrace almost every subject of human knowledge. According to a MS. in the Escorial, there are nearly eighty, most of which treat of philosophy, medicine, and the kindred sciences. Some are known only by Latin or Hebrew translations, others remain unedited. Of the former, the most valuable, and those that exercised the greatest influence upon the philosophy of Latin Christendom in the middle ages, were his commentaries and paraphrases upon Aristotle, of which a Latin version was published at Venice in 11 vols. 1552-53. See Renan's *Averroës et l'Averroïsme* (Par. 1852).

AVERHOA, a genus of plants belonging to the order *Oxalidaceæ*. See CARAMBOLA.

AVERSA, a town in the province of Caserta, S. Italy, midway between Naples and Capua. It lies in a delightful district of vineyards and orange-groves, is the see of a bishop, and has a cathedral. The Normans built A. in 1029, on land granted by Duke Sergius of Naples. In 1345 Andreas of Hungary was murdered here, with the connivance of his wife, Joanna I. of Naples. Near to A. is the site of the old Oscan Atella. See ATELLANÆ. Pop. 15,902.

AVES. See ORNITHOLOGY.

AVEYRON, a department of France, in the basin of the Garonne, with the highlands of Auvergne on the N., and on the W. the Cevennes, by the offsets of which it is traversed. Two-thirds of the surface are cultivated, and yield corn, rye, potatoes, fruit, and truffles; the rest affords excellent pasturage for cattle, goats, and sheep. Its cheese is famed. The department is watered by the A., Lot, Tarn, and other feeders of the Garonne. It is rich in iron, coal, lead, zinc, copper, antimony, and vitrol; and besides mining, there is much cotton-spinning, tanning, and carpet-weaving. Rhodéz is the chief town. Area,

3402 sq. miles; pop. (1872) 402,474.—The river A., 90 miles long, rises near Severac-le-Château, flows W. to Montauban, where it joins the Tarn, a branch of the Garonne.

AVEZZANO, a town in the province of Aquila, S. Italy, 22 miles S. of Aquila, lies on the Via Vateria, and is a possession of the Barberini family. Lake Fucino, from which numerous marbles with inscriptions have been recovered, is about a mile distant. These marbles are carefully preserved in the churches of the town. Pop. 5146.

AVIARY (Lat. *aviarium*, from *avis* a bird), a place for keeping birds. Aviaries are of different kinds and sizes, from the domestic cage up to the extensive arrangements seen in zoological gardens. When the birds belong to warm regions, the aviaries are generally in connection with hothouses for the purpose of artificially regulating the temperature; if natives of temperate climates, the open garden is enough. The enclosure of each bird is usually covered with netting.

AVICENNA, a Latinised form of Ibn-Sina, the name of a famous Eastern physician and philosopher, born (according to Ibn-Khallikan) in 980, in the neighbourhood of Bokhara, to which city his parents removed while A. was still young. At Bokhara he commenced his studies, and exhibited a wonderful precocity, acquiring, at an incredibly early age, a competent knowledge of the Koran, of arithmetic and algebra, of the categories of Aristotle, the elements of Euclid, and jurisprudence. At sixteen he applied himself with ardour to the study of natural philosophy and medicine, and with the aid of the commentary of Abu-Nasr Alfarabi, mastered the logic and metaphysics of Aristotle. At twenty-one he wrote an *Encyclopædia* of the sciences, and not long after gave public lectures on logic and the *Almagest* of Ptolemy. His fame as a scholar and physician procured for him in turn the patronage of the rulers of Khorassan, Khwarezm, and Hamadan. He passed the last fourteen years of his life at the court of the Emir of Ispahan, where he wrote the greater part of his works on logic, metaphysics, astronomy, and geometry. He died at Hamadan in 1037, his end having, it is said, been hastened by indulgences unbecoming a philosopher, hence the proverb, that his philosophy could not give him wisdom, nor his medicine health. The writings of A. number more than a hundred. His principal work, *Kutab-ul-kanuni-fil-Tibb* (Book of the Canon of Medicine), was printed in Arabic at Rome in 1593, in 4 vols. folio. It is selected for the most part from the works of the Greek physicians, and was long in great repute. Several translations were made into Hebrew, one of which, attributed to the Rabbi Nathan Amathi, was published at Naples in 1491, in 3 vols. fol. Latin translations are very common; there were at least fourteen before the end of the 15th c., the earliest was by Gerardus Cremonensis, a revised and corrected edition of which, with notes, was printed at Venice in 1595, in 2 vols. fol. A.'s metaphysical writings, and his numerous contributions to physical science, were highly prized, and found many editors; but a large number of his works have never been edited, and the MSS. are scattered over the great libraries of Europe. See Wüstenfeld's *Geschichte der Arabischen Aerzte und Naturforscher* (1840).

AVICENNIA, a genus of Dicotyledonous trees and shrubs belonging to the order Verbenaceæ (q. v.). They grow in swampy estuaries in tropical countries, and are called white mangroves. *A. tomentosa* is used for tanning in Rio, and its ashes are employed for cleaning cotton cloth in India. The bark of *A. nitida* is used for tanning in the W. Indies. In New Zealand a resinous substance got from *A. resinifera* is eaten.

AVICULA, a genus of *Lamellibranchiate* Mollusca, forming the type of the family *Aviculida*, in which the shell is inequivalve oblique, and fixed by a *byssus* or 'beard'; the hinge is toothless, the mantle-lobes free, the posterior adductor muscle being larger than the anterior; the foot is of small size. The genus is represented by the *Avicula*, by the *Pinna* or 'wing-shells,' and by the pearl-oysters (*Avicula* or *Meleagrina Margaritifera*), &c.

AVIGLIANO, a town in the province of Basilicata, S. Italy, 10 miles N.W. of Potenza, with a collegiate church. There are rich pasture lands in the neighbourhood, on which a celebrated breed of cattle is reared. Pop. 9236.

AVIGNON, the chief city of the department of Vaucluse, in

the S.E. of France, on the left bank of the Rhone, and a station on the railway from Lyon to Marseille, has a population (1872) of 27,409. It is an archiepiscopal see, and its ecclesiastical structures are numerous and imposing. The most celebrated are *La Chapelle des Doms*, containing the mausoleum of Pope John XXII., which is considered a masterpiece of the 16th c., the papal castle, a singular structure of vast size and diverse architecture, the church of St Peter, and that of the Coelestines. The city is rich in valuable collections, classic and mediæval. At one time A. possessed a university, but it was abolished in 1794, after having existed nearly five centuries. The vicinity is pleasant; the district produces grain, fruits, and wine, and there are manufactures of silks, muslins, calicos, tanneries, brass and iron-foundries. From 1305 to 1377 A. was the residence of seven occupants of St Peter's chair, as well as of some anti-popes. Two ecclesiastical councils were held here (1326 and 1337). It was at A. that Petrarch first saw Laura, and her tomb is in the Franciscan church.—A. the *Avenio Cavarum* of the Romans, first became a possession of the French crown in 1226, but was sold to Pope Clement VI. for 80,000 gold florins.

Avila, the capital of a province of the same name, Old Castile, Spain, on the Adaja, 53 miles N.W. of Madrid. It is the see of a bishop-suffragan, with a grand cathedral, and a university. Though now much decayed, it was formerly one of the richest cities in Spain. The nobles of Old Castile met at A. in 1465 for the purpose of raising Alfonso V. to the throne; and here also assembled the Third Estate or Holy League in 1520, at which almost every city of Castile was represented. A. was the birthplace of the voluminous pedant Alfonso Tostado de Madrigal, created bishop of A. in 1449, and of 'our seraphic mother, the holy Teresa, spouse of Jesus,' who was made lady-patroness of Spain by Philip III., and was canonised by Gregory XV. in 1622. The town abounds in rich sculpture. Pop. 6420.

Avila Y Zuñiga, Don Luiz de, a Spanish soldier and historian about 1490, born at Placencia, Estremadura. He was appointed ambassador from Charles V. to Popes Paul IV. and Pius IV., and engaged in the war waged by Charles in 1546-47, against the princes of the league of Schmalkald, of which he wrote a graphic account under the title *Commentarios de la Guerra de Alemania, hecha por Carlos, 5 en 1546 y 1547*. It was first printed in Spain in 1547, then at Amsterdam in 1550, turned into Italian (Ven. 1548) by the author himself, and has been repeatedly translated into French and German.

Avila, Gil Gonzalez de, a learned Jesuit, author of many historical works, was born at Avila, Old Castile, in 1577, and died April 25, 1658. The most valuable are his *Historia de la Vida y Hechos del Rey Don Henrique III. de Castilla* (Madr. 1638); *Historia de la Vida y Hechos del Monarca Don Felipe III.*; *Historia de Salamanca* (Salam. 1806); and *Teatro Eclesiastico de la primitiva Iglesia de las Indias Occidentales* (2 vols. Madr. 1649-56).

Aviles, an ancient town in the province of Oviedo, Spain, 19 miles N. by W. of Oviedo, at the mouth of a navigable branch of the Aviles. Copper and coal are found in the vicinity, and there are manufactures of glass and earthenware. The original charter granted by Alonzo VII. in 1135 is still preserved in the municipal archives. Pop. 7400.

Aviz, a Portuguese order of knighthood, instituted, like the Spanish order of Calatrava, to resist and quell the Moors. It dates from the reign (1185-1211) of Sancho, second King of Portugal, and still exists as an order of merit.

Avoca'do Pear, the name given to the fruit of *Persea gratissima*, a tree belonging to the order Lauraceæ (q. v.). It is common in tropical America and the West Indian Islands, where the fruit is highly esteemed. The pulp has a buttery taste, and is generally eaten with spice, or pepper and salt. An excellent oil for burning is expressed from the pulp, and a black dye is obtained from the seeds. The fruit has also been called alligator pear, vegetable marrow, and midshipman's butter.

Avocet' (*Recurvirostra*), a genus of Grallatorial or Wading birds, distinguished by the elongated bill, which is curved upwards at the tip. The legs are elongated, and the toes are more fully webbed than in the majority of true wading birds.

The average length of the British species (*R. avocetta*) is about eighteen inches, the plumage being coloured white and black. It is now comparatively rare in England, but was formerly common in marshes and fens. It occurs also in Europe, Asia, and S. Africa. In the American A. (*R. Americana*), the bill is less curved than in the British species. The wings in both species are well developed. Other species inhabit N. America, India, and Australia.



Avocet.

Avoid'ance is a term of English ecclesiastical law, signifying that a benefice is vacant.

Avoir'dupois, or **Aver-dupois**, usually said to be derived from the French *avoir du pois*, to have weight, but, considering the older form of the word, the verb from which it comes is probably not *avoir*, but the middle-age Latin verb *averare* (obsolete French *averer*, to *aver* or *verify*), is the system of weights used in this country for all goods, except the precious metals and medicines. The *ton* contains 20 *hundredweights* (cwt.), 80 *quarters* (qr.), and 2240 *pounds* (lb.); the *pound* contains 16 *ounces* (oz.), 256 *drams* (dr.), and 7000 *grains* (gr.) Troy. A *stone*, which is in extensive use, is 14 lbs., or half a quarter. In New York, and some other American districts, the cwt. contains only 100 lbs., and the ton 2000 lbs.

Avon, a Celtic word signifying a river. The Welsh form is *Afon*; the Manx, *Aon*; the Gaelic, *Abhainn* (pron. *Avain*). The root is seen in the Sansk. *Ap* or *Ab*, water. See AA. A. is the name of many streams in England and Scotland, and enters into the composition of many words denoting streams in every Celtic country in Europe. Of the British Avons, the first in point of fame is the Warwickshire A., which rises in Northamptonshire, and flows, mainly in a south-westerly direction, through the counties of Warwick and Worcester, past Rugby, Warwick Stratford, and Evesham, till it joins the Severn at Tewkesbury, after a course of 100 miles. Two other Avons in England merit notice, one of which, in the lower part of its course, forms the boundary between Gloucester and Somerset, and after passing Bath and Bristol, discharges itself into the Bristol Channel below the latter city; the other, rising in the Wiltshire Downs, flows S. through Salisbury Plain and the W. side of Hampshire, past Amesbury and Salisbury, entering the English Channel at Christ Church. The Welsh Avons are very small, and so are the Scotch, the largest being the Lanarkshire A., which rises on the borders of Ayrshire, and flows N.E. past Strathavon, joining the Clyde at Hamilton.

Avanches, a town in the department of Manche, France, 55 miles S.W. of Caen, near the mouth of the Séez, which enters the Bay of Mont St Michel. It has some trade in hemp, flax, lace, bricks, cider, and sea-salt, and possesses a museum, botanical garden, and public library of 25,000 volumes and 200 manuscripts. A. is a favourite resort of English families. Pop. (1872) 7324. A. is the old Ingena of the Gallic Abrincatui, who have given name to the modern town. It was the seat of a bishop from the 6th c. to 1791, was fortified by Charlemagne as a frontier defence against the Celts of Brittany, and under Lanfranc (q. v.) became a great school of philosophy. In the Hundred Years' War between France and England, it was repeatedly taken by both parties, and suffered a similar fortune in the 16th c. during the Huguenot wars. Its fine cathedral, ruined during the revolution of 1789, had to be taken down in 1799 for safety. A stone on which Henry II. of England is said to have knelt to receive absolution from the papal legate is still preserved.

Awe, Loch (Gael. *Abh*, the water), next to Loch Lomond, the largest lake in Scotland, lies in the heart of Argyleshire, overshadowed by lofty mountains. It is about 24 miles long, from a mile to 1½ miles broad, and extends N.E. and S.W. Its surface, which seldom freezes, lies 108 feet above the sea. At its N.W. end are many picturesque islands, on one of which

(Fraccheilean) are the ruins of a castle built in the reign of Alexander III. Here also, on a peninsula, stands Kilchurn Castle (Gael. *Chaoil-chuirn*, 'the narrow cairn'), built in 1440, and garrisoned by royal troops till 1745. The river A., 7 miles long, connects the lake in the N. with Loch Etive, an arm of the sea. Near the point where the river issues is the grand 'Pass of A.,' or Pass of Brander, above which Ben Cruachan rises to a height of 3669 feet. Loch A. abounds in salmon and trout, its chief feeders are the Orchy and Strae, and anglers can now find excellent quarters at the inn of Port-Sonachan.

Awn, or **Arista**, the name given to the beard of corn (oat), or any such slender process. Examples of it are also seen in barley, rye, and bearded wheat.

Axe, a form of *Exe* (Cymric, *Uysg*, Latinised into *Isca*, thence *Exe* or *Ax*), the name of two small English streams, one of which rises on the southern slope of the Mendip Hills, not far from Wells, and flows N.W. into the Bristol Channel, near Weston-super-Mare; the other has its origin on the sides of the Dorsetshire Downs, and flows S. through the eastern border of Devonshire, past Axminster, into Lyme Bay, on the English Channel.

Axel, or **Ab'salon**, Archbishop of Lund, one of the great promoters of Christian civilisation in the N. of Europe, was born at Finnestoe, in the isle of Zealand, in 1128. He was a kinsman of Waldemar, afterwards King of Denmark, and on his return from Paris, whither he had gone to complete his studies, he was made Bishop of Roskilde, and a member of the king's council. A., though a churchman, was also a strong patriot, and the Norse fire burned in his blood. He chased the Wendish pirates from the Danish coasts, and forced them to accept Christianity in the isle of Rugen, after burning the temple of their god Svanovit at Arkona. In 1178 he became Archbishop of Lund. A fortress which he erected on the Sound as a defence against the Baltic pirates was the origin of Copenhagen. A. energetically defended against the German emperor the rights of the King of Denmark over the Baltic provinces wrested from the Wends, and extended Danish authority over Mecklenburg and Esthonia. The code of Waldemar was partly his work. A. was no less diligent in the affairs of the church than in those of the state. He reformed the 'rules' of the Danish monasteries. Literature is also indebted to him. It was at the request of A. that Saxo Grammaticus (q. v.) wrote his valuable *History of Denmark*; and he is also believed to be the person who ordered the monks of Sorø to draw up the annals of the kingdom. He died in 1201. See Estrup's *Ab'salon considered as a Hero, a Statesman, and a Bishop* (Sorø, 1856).

Axe'stone, a hard greenish-coloured stone, considered a variety of nephrite (q. v.), or jade. It is so named because the New Zealanders, and the inhabitants of other islands in the S. Pacific, fashion it into axes and other weapons.

Axholme Isle, a flat fertile tract in the N. of Lincolnshire, formerly a 'river island,' completely encircled by the rivers Trent, Don, Torme, and Vicardyke. It is 18 miles long, about 5 broad; contains seven parishes, also two market towns, Crowle and Epworth, and abounds with gypsum and beds of peat. It was a marsh till 1634, when it was drained by Cornelius Vermuyden, a Dutchman, at a cost of £56,000. Many Dutch and French Protestants having settled here, a tedious lawsuit (1691) established their right to 2868 acres, the original residents receiving 10,532. The name is a hybrid, the first syllable being the Celtic *Ax*, 'water,' and the second the Danish *holm*, 'an island.' To this, 'Isle' has been superfluously added in later times.

Axil, in botany, is applied to the angle formed between the axis and any organ that grows from it; for example, buds are formed in the A. of leaves.

Axill'a is the armpit. When the arm is extended at the shoulder-joint, the A. is a pyramidal space, the apex of which is situated between the clavicle and first rib, while the base is formed by the skin. It contains a large quantity of loose areolar tissue, fat, lymphatic glands, the axillary artery, veins, and numerous nerves. It is frequently the seat of abscesses and tumours.

Axi'nomancy (Gr. *axinē*, an axe; and *mantia*, divination), a Greek mode of divination, by which a guilty person was pointed out by the motion of an axe balanced on a pole, or by that of an

agate put on a heated axe-blade. He was deemed the criminal at the recital of whose name the axe moved. See DIVINATION.

Axiom (Gr. *axiōma*, lit., what is thought fit; hence what should be accepted), a term used in scientific inquiry to denote what is already assumed as the basis of demonstration; and in mathematics is specifically applied to what is or seems to be a self-evident proposition. Geometry is based by Euclid on a few axioms, or common notions, the truth of which is admitted as soon as the terms in which they are expressed are understood, and which could not be made plainer by any attempted demonstration. The distinction, now accepted, between postulates and axioms, viz., that the former are assumed problems, and the latter assumed theorems, does not exist in Euclid. It was first adopted by Simson, but the author is unknown. Axioms, though universally received, are not necessary truths.

Axis, in geometry, is an arbitrary straight line which is convenient for reference with respect to any motion or other phenomenon. Thus we have axes of rotation, co-ordinates, polarization, inertia, &c. We have the magnetic A., the axes of a crystal, the A. of a lens and of a telescope, &c. For further information, the reader is referred to the special articles.

Axis is the second vertebra, and forms a pivot on which the atlas and head rotate. The body of the vertebra supports the odontoid process which passes through the posterior part of the ring of the atlas. This process is kept in position by a powerful transverse ligament, while too great an extent of rotation is prevented by the action of two small ligaments passing from the occipital bone to the odontoid process termed the check ligaments. Fracture of the odontoid process of the A. causes instant death, by pressure on the *medulla oblongata*.

Axis, in botany, is applied to the stem and root, or any centre round which leaves or other organs are arranged; thus the stem is called the *ascending A.*, the root the *descending A.*, and the stem on which the flowers are developed, the *floral A.*

Axminster, a town in Devonshire, on the Axe, 25 miles S. of Taunton. It has some manufactures of druggets and woollens, and was formerly famed for its carpets, but this industry has been removed to Wilton. A. is said to have been founded by King Æthelstan in 937, and has a very old church. Pop. (1871) 2861.

Ax'mouth, a fishing-village in Devonshire, at the mouth of the Axe, near which, in 1839, occurred an extraordinary landslip, forming a chasm nearly a mile long, 200 feet wide, and 250 deep. It resulted from the action of the sea on the greensand strata of which the coast consists.

Axolotl, a genus of *Urodela*, or 'Tailed' Amphibians, found in Mexican lakes, possessing four limbs, the front pair each having four, and the hinder five toes. The Mexican A. (*Siredon pisciforme*) is the best-known form. It is a *perennibranchiate* amphibian, retaining the external gills or branchiae of early life throughout its entire existence, and possessing lungs in addition to these branchiae. The gills appear as three external fringe-like processes borne on each side of the neck. In confinement, the Axolotls may lose their gills: one species—*Siredon lichemoides* of Western America—exemplifying this change. These animals possess dorsal and caudal or tail fins. They average 8 or 9 inches in length, and are eaten in Mexico.

Ax'um (anc. *Auxumē*) in the province of Tigré, Abyssinia, formerly the capital of the Ethiopian empire of A., which included Abyssinia, and portions of S.W. Arabia. The empire formed the southern boundary to the power of Rome, commanded the commerce of the Red Sea, traded with India. Greek philosophy and Christianity were introduced from Egypt, the first bishop being Frumentius, and A. contained probably the first Christian community in Abyssinia. A. incurred the enmity of the Arabs in the 6th c. by interfering on behalf of the Arabian Christians, the result of which was a succession of contests, which culminated in its fall, and the dissolution of the empire. The modern A. is a place of from 2000 to 3000 inhabitants, and is rich in remains of antiquity, obelisks, altars, catacombs, tablets, inscriptions, &c. It is even yet a holy city for Abyssinian Christians, where all feuds must cease.

Ayacucho, the capital of a department of the same name, Peru, famous as the place where the Colombian and Peruvian

allies defeated the Spanish forces, 9th December 1824, and so ended the Spanish rule on the continent of America. The battle field is called *La Puerta de los Muertos* ('The Gate of the Dead'). The town of A. has 24 churches, and carries on considerable trade. Pop. 28,000.

Aya'la, **Perdo Lopez de**, Spanish historian and poet, born in Murcia 1332. A cadet of one of the best Castilian families, he filled high offices of state under four successive monarchs. In 1367, at the battle of Najera, he was captured and imprisoned by the English; and again by the Portuguese at the battle of Aljubarota (1385). His *Crónicas de los Reyes de Castilla*, *Don Pedro*, *Don Henrique II.*, *Don Juan I.*, y *Don Henrique III.* (2 vols. Madr. 1779-80), is the first Spanish work in which a philosophical review of events, and not a mere simple narrative of facts, is attempted. His poem, *El Rimado de Palacio* ('Rhymes of the Court'), is a satirical poem, in which for the first time the popular early ballad form is abandoned, and a more modern style of composition attempted. A. was also the first translator of Livy into Spanish.

Ayamonte, a fortified town in Spain, province of Huelva, on an acclivity near the mouth of the Guadiana, where it separates Spain from Portugal. Fishing is the principal industry. Boat-building and lacemaking, formerly largely engaged in, have much fallen off, and there are unimportant manufactures of soap and earthenware. Pop. 5500.

Aye-Aye (*Cheiromys Madagascariensis*), a Quadrumanous mammal or monkey, belonging to the *Strepsirrhine* ('twisted-nostrils') section of the Quadrumana (q. v.), and found exclusively in Madagascar. The nostrils are curved, and placed at the extremity of the nose. This animal resembles a large squirrel, the tail being bushy. No canine teeth exist, the molars and incisors being widely separated, and the latter teeth growing throughout life as in Rodentia. All the feet have five toes, but the thumb is hardly opposable to the other fingers, the hind toe being opposable. The middle finger is as long as the ring finger, and the second toe is terminated by a long claw-like nail. The ears are large. The A. is of nocturnal habits, and feeds on insects and fruits.



Aye-Aye.

Ayeshah, the favourite wife of Mohammed, to whom she was married when only nine years old, was born in 610 or 611 A.D. As she was the only one of the Prophet's wives who was a virgin, her father's name was changed from Abdallah to Abu-Bekr, 'the father of the virgin.' In his last illness Mohammed had himself carried to her house, where he died in her arms. An accusation of adultery having been brought against her, Mohammed composed the twenty-fourth chapter of the Koran to demonstrate her purity, and declared that every calumniator deserved eternal damnation. After the assassination of Othman, she opposed the accession of Ali, who had at first believed in her guilt. Ali, however, defeated her troops, took herself prisoner, but dismissed her with permission to reside anywhere in Arabia she pleased, as long as she kept aloof from affairs of state. As a prophetess, her interpretations of the Koran were authoritative. She died at Medina in 677 A.D.

Aylesbury, a town in Buckinghamshire, to the S. of the Thame, 40 miles N.W. of London by rail. It overlooks the picturesque vale of A., through which a rivulet flows to the Thame. The occupations are chiefly agricultural, but there are also strawplait, 'bone-lace,' and silk manufactures. The rearing of ducks for the London Christmas market is largely carried on. A. was a stronghold of the Britons, and was not taken by the Saxons till 571, when it was called *Aeglesbyrig*, perhaps in honour of Egitil, the hero-archer. It sends two members to parliament. Pop. (1872) 28,760.

Ayliffe, **Sir Joseph**, a meritorious English antiquary, was born about 1708, near Framfield, Sussex. In 1731 he was chosen a fellow of the Royal Society; in 1732 a fellow of the Society of Antiquaries, and ultimately vice-president. He was

one of three commissioners appointed for the preservation of the papers in the new State-Paper Office, on its establishment in 1763. In 1772 he printed *Calendars of the Ancient Charters*, &c., in the Tower of London, and also edited Leland's *Collectanea* (9 vols.), Hearn's *Curious Discourses*, &c. At his death, 19th April 1781, he was engaged on a work on *Sepulchral Monuments*, afterwards completed by Gough.

Aymon, the surname of Alard, Richard, Guiscard, and Renaud, sons of Aymon, Count of Dordogne, favourite heroes of the chivalric literature of the middle ages. Their exploits are mainly mythical, forming part of the marvels attributed to Charlemagne and his followers. Huon de Villeneuve, a French poet, who flourished in the reign of Philippe Auguste, makes them the heroes of a novel, *Les Quatre Fils Aymon*, and Ariosto's *Roland* treats chiefly of the adventures of Renaud, traditionally the bravest of the brothers. Tieck's well-known work on the exploits of the brothers, and of their horse Bayard, is drawn apparently from a different source.

Ayora, a town in Valencia, Spain, 50 miles S.W. of Valencia, on the river A. Husbandry and the manufacture of oil are the chief industries. The ruins of an old castle crown the summit of a hill in the vicinity. Pop. 5412.

Ayr, the capital of Ayrshire, on the left bank of the A., 33 miles S.S.W. of Glasgow. The river is spanned by the 'Auld Brig' and 'New Brig' celebrated by Burns. The town is ancient, its charter, granted by William the Lion, dating from about 1202. During the wars of Edward I. it was (according to Blind Harry) the scene of some of Wallace's earliest exploits, but no earlier Scottish writer associates the hero with the place. The modern town is clean and well-built, and many handsome villas have been erected to the S. and W. A. exports annually about 200,000 tons of coal, and the trade will be much increased when the wet dock, at present in course of construction, and estimated to cost £140,000, is completed. Pop., including Newton-upon-Ayr (1871), 17,954. A., in conjunction with Campbelton, Irvine, Luverary, and Oban, sends a member to parliament. The town and the county receive their name from the river A., a name which is probably a survival from the old times of the Strathclyde Britons, signifying in Cymric 'the gentle wate.'

Ayrshire, a maritime county in the S.W. of Scotland, area 1149 sq. miles. The surface undulates, reaching no great elevation except in the S. and S.E., which are somewhat mountainous, while there are a few hills on the N. The principal rivers, all short, are the Ayr and the Doon, traversing the centre of the county, the Girvan and Stinchar the S., and the Irvine and Garnock the N. Coal has been long worked extensively and profitably, freestone and limestone abound, and there are rich beds of ironstone. The soil on the coast is sandy, clayey in the interior, and on the E. there are extensive moorlands. Agriculture is in a flourishing condition, and the farms, generally small, are in a high state of cultivation. Dairy-husbandry prevails, Dunlop cheese being still deservedly famous, though cheese-making by the Cheddar process is carried on to a large extent; and A. milch-cows are unsurpassed for dairy purposes. In 1874 there were 311,529 acres in crop or pasture. Woollen and cotton manufactures, ironworks, and engineering, are carried on largely at Kilmarnock. There are cotton-works at Catrine, and there is a pottery at Cumnock. Extensive ironworks have been erected at Muirkirk, Kilwinning, Dalry, Ardeer, Hurlford, and Dalmellington. Fancy woodwork, in the shape of snuff-boxes, card-cases, &c., employs numerous hands in Mauchline and Old Cumnock. Anciently A. was divided into Carrick, S. of the Doon; Kyle, between the Doon and the Irvine; and Cunningham, N. of the Irvine. The district between the Ayr and the Doon was sometimes called Kyle-Stewart. Pop. (1871) 200,809. A. returns two members to parliament, one for N. A., and one for S. A. The chief towns are, Ayr, Kilmarnock, Irvine, Ardrossan, Maybole, and Largs. A. is famous for its struggles and sufferings for the Covenant.

Ayrshire Cattle. The characteristics of these cattle are a plentiful flow of milk, varying from twenty-four to thirty-four quarts daily. The head of a pure Ayrshire should be broad, gradually tapering downwards to the nostrils, which should be expanded, and dark. The colour of the animals varies much, from white,

with light-brown and yellow patches, to dark-brown with white spots, and from orange to dark-brown with marbled flecks. The butter-colour, other things being equal, is preferred. The eye should be full, the shape wedge-like, the shoulders being the thin edge. Thence to the tail the body should gradually deepen to the loins, and width across the backbones is essential to sustain the udder, which is the most important point in this breed. The udder should be so distended as to fill out the whole space between the hind legs, and tapering thence towards the belly. The legs should be straight, tapering gradually. The horns should curve slightly upwards. Tail long and bushy. Bulls should be broader in shoulders, deeper round the heart than cows, and rounder in the quarters. The milk given by Ayrshires is much esteemed, and is mostly devoted to cheese-making.

Ayton, Sir Robert, poet, born at Kinaldie, Fifeshire, 1570; studied at St Andrews, and graduated there in 1588; and completed his studies in France. He held in succession important positions in the courts of James I. and Charles I. His poems are written in pure and elegant English, and Burns has paraphrased several of them, one of which at least he has not improved. A. seems to have been an accomplished scholar, as he wrote verses in Greek, Latin, and French. He enjoyed the friendship of the wits of his day, among others of Ben Jonson. He died at Whitehall in March 1638. A.'s poems have appeared in part in several publications. Ten are to be found in Watson's *Collection of Scottish Poems* (1706-11). His Latin poems are given in Johnston's *Delicia Poetarum Scotorum*, i. 40, et seq.; and a collected edition of his poems was edited by Dr Charles Rogers, from a MS. in his possession and other authentic sources (Edinb. 1844).

Aytoun, William Edmondstone, poet and humourist, was born at Edinburgh 1813, studied there, and subsequently in Germany. He was called to the Scottish bar in 1840, was appointed professor of Rhetoric and Belles-Lettres in the University of Edinburgh in 1845, and Sheriff of Orkney and Shetland in 1852. A. is joint author with Theodore Martin of a volume of clever parodies and humorous pieces called the *Bon Gaultier Bailads* (1854), and of a volume of translations of Goethe's minor poems (Lond. 1859); and in 1849 he published the work on which his reputation as a poet rests—*Lays of the Scottish Cavaliers, and other Poems. Firmilian, a Spasmodic Tragedy*, a caricature of the school of poets of whom Bailey, Dobell, and Alexander Smith were the chief representatives, was published in 1854, and *Bothwell* in 1856. Not the least valuable of his works is his *Ballads of Scotland* (2 vols. Edinb. 1858). A. was one of the brightest journalists of his day. Of his tales, published in *Blackwood*, of which he was long a valued contributor, the best known for their broad and robust humour are *The Glenmutchkin Railway*, and *How I Became a Yeoman*. His professorial lectures were a series of admirable readings, remarkable for their graceful and picturesque style. His latest work was a novel entitled *Norman Sinclair* (Edinb. 1861). A. died at Edinburgh, August 4, 1865. See *Memoir of W. E. A.*, by Theodore Martin (Edinb. 1867).

Ayuntamien'to, the name given in Spain to the municipal council, or governing body of towns. During the long wars with the Moors, when it was necessary for each town to hold itself constantly prepared to resist sudden attack, the A. rose to great influence and power. During the last three centuries its influence and efficiency flourished or waned with the vicissitudes of the national liberty. By a statute of 1837, the A. is declared a body freely elected by the people, presided over by the alcalde, and having full control of municipal affairs—police, taxes, local funds, &c. A subsequent Act (1840), which proposed to deprive the A. of all political power, led to insurrection, and the expulsion of the queen, Maria Christina; but in 1844 an Act similar in its provisions was passed.

Azadirach'ta Indica, an Indian tree belonging to the order *Meliaceæ*. An acrid oil is obtained from its fruit, which is used in India for burning as well as for dyeing cotton. Its bark is a tonic, and its root has been used as a vermifuge.

Azalea, a genus of shrubby plants belonging to the order *Ericaceæ*, or Heath family. Many of them have showy, sweet-scented flowers, and bear a general resemblance to Rhododen-

drons (q. v.). There are about twenty-five species, natives of N. America and Asia. *A. pontica* is a yellow-flowered, fragrant species, found in the countries around the Black Sea, and being quite hardy in Britain, is common in gardens. It possesses dangerous narcotic qualities, which poison cattle and sheep which chance to eat it. It has been stated that it was from the flowers of this plant that 'the bees of Pontus collected the honey that produced the extraordinary symptoms of poisoning described as having attacked the Greek soldiers in the famous retreat of the Ten Thousand. Xenophon says that after eating it the men fell stupified in all directions, so that the camp looked like a battlefield covered with corpses.' *A. Indica* is a beautiful greenhouse shrub when in flower; there are several varieties of it, of various tints of colour. *A. procumbens* is a small trailing species found on the Scotch mountains, as well as on the Alps of Central Europe and in N. America.

Azeglio, Massimo Taparelli, Marchese d', a celebrated writer, artist, and statesman of Italy, was born at Turin in 1798. His father, of a noble family of Piedmont, having gone as ambassador to Rome, A., when fourteen years old, followed him. He devoted himself with much enthusiasm to the study of painting, music, and belles-lettres, but his studies were cut short by his being appointed an officer in the Piedmontese cavalry. Still his passion for art and literature continued unabated, and the severity of his studies was so great that he fell seriously ill, and was obliged to leave the army. On his recovery, he proved himself to be more than an amateur in the fine arts, for his picture representing the *Origin of the Sforza Family* is reckoned a masterpiece. Italian politics also engaged his earnest attention; and his novels *Ettore Fieramosca* (1831), and *Nicolo di Lapi* (1841), did much to fire the national spirit of Italy. A. is understood to have had an influence in determining Pio Nono in favour of that liberal policy that marked the beginning of his pontifical rule, and it was at this period he published his important pamphlets on the Laws of the Press, the Emancipation of the Jews, &c. In 1848 he marched from Rome at the head of the Papal troops charged to co operate with Charles Albert against the Austrians. He commanded a legion at the battle of Vicenza, where he was somewhat severely wounded. In 1849, after the battle of Novara, Victor Emanuele made him President of the Cabinet. At the close of the war in 1859 he received the temporary office of Military Commissioner Extraordinary for the Roman States. In these high offices the influence of A. was always exerted in an unselfish and patriotic spirit; and on his retirement his advice—ever temperate, but never weak—continued to be of infinite benefit to his country. He died 15th January 1866. His first wife was a daughter of Manzoni. His Memoirs appeared in 1867 (Germ. transl. 1869); and his Political Correspondence (1847-65) was published by Rendu in 1866. See Ratti's *Vita e Meriti di M. A.* (1868).

Azerbijan' (anc. *Media Atropatene*), a fertile province in the N. of Persia, bordering on Turkish Kurdistan on the W., and on Russia on the N., intersected by many mountain ranges rising from 7000 to 9000 feet high. It yields rice, wheat, barley, maize, flax, hemp, cotton, saffron, and tobacco; iron, lead, copper, sulphur, salt, and salt-petre are found; and the chief manufactures are velvet, silk stuffs, woollens, and leather. Many camels, horses, cattle, and sheep are reared. The largest rivers are Aras or *Araxes*, the Kara Su, the Kizil-Uzen, and several others which fall into the Urumiyah, the largest salt lake in Persia. The alternations of temperature are extreme, but the climate is healthy. Tabriz (q. v.) is the capital. The highest peak in the province is Savalan, 13,000 feet, and on the N.W. frontier rises Mount Ararat. Area, 30,000 sq. miles; pop. estimated at 900,000.

Azimabad', or **Tirow'li**, a fortified town of Sirhind, India, 9 miles N.W. of Kurnal, with a spacious caravanserai within an embattled wall, and surrounded by a ditch to which water can at any time be admitted. Pop. some 6000.

Azimghur' or **Azim's Fort**, a town in a district of the same name, N.W. Provinces, division of Benares, India, on the Tons, a branch of the Gogra, 109 miles N.W. of Allahabad. The river, which is navigable, is here crossed by a bridge of boats. During the mutiny the sepoys revolted at A., and on July 18, 1857, an engagement with a small English force took place, in which nearly 200 rebels were slain. Pop., apart from the garri-

son (1872), 14,543. The district of A. is 2550 sq. miles in extent, with a pop. in 1872 of 1,531,410, chiefly employed in the manufacture of cotton and silk.

Az'muth of a heavenly body, is the angular distance of that point on the horizon directly under the body from the N. or S. point of the horizon. The word is probably a corruption of the Arabic *as-sumūt*, signifying *the way, path, tract, or quarter*. The A. circle is a circle all of whose points have the same A., that is, a vertical circle.

Az'incourt. See AG'INCOURT.

Azores (Port. *Ilhas Açores*, i.e., 'hawk islands,' called also *Ilhas Terceiras*), a cluster of nine islands in the N. Atlantic, between 36° 50' and 39° 50' N. lat., and 24° 30' and 31° 20' W. long., about 800 miles W. of Portugal, of which kingdom they form a province, not a dependency. Their names are: St Mary, St Michael, Terceira, Gracioso, St Jorgo, Pico, Fayal, Flores, and Corvo. Their total area is 999 miles, the pop. (1871) 258,933, and the capital Angra, in Terceira. The islands are volcanic, and much loss of life and property has been occasioned by eruptions, especially by that of May 1808. The islands are in general mountainous, the highest elevation (*Pico Alto*), which is in Pico, being 7613 feet. The soil is fertile, and produces abundantly vines, oranges, and lemons; and wheat, Indian-corn, and pulse are exported in considerable quantities. There is also some export trade in coarse linens, corn, cheese, and salted meat. The purity and mildness of the climate attract many persons affected with pulmonary complaints. That the A. were known to the Carthaginians is proved by the Punic coins found in Corvo. The Arabs and Normans also appear to have visited them, but it is to the Portuguese Gonçalo Velho Cabral that Europe owes its first definite knowledge of them. He rediscovered them in 1431-32, and in 1436 we find them laid down in a map of the world by the Venetian Andreas Bianco. Alfonso V. gave Fayal to his aunt Isabella, Duchess of Burgundy, in 1466, who peopled it with Flemish colonists. Hence the name *Ilhas Flamengas* which was often given to the A., though some erroneously suppose that this name arose from the islands having been first discovered in 1439 by a Flemish captain, Vanderborg of Bruges.

Azote, the name given by Lavoisier to nitrogen.

Azotised Bodies are literally those which contain *azote* or nitrogen, but the term is usually employed in a more limited sense to designate nitrogenous substances of animal or vegetable origin only. The chief A. B. are fibrine, albumen, casein, gelatin, urea, uric acid, hippuric acid, gluten, &c., and many alkaloids. Detailed information concerning these bodies will be found under their respective headings.

Azo'tus, the Ashdod of the Old Testament, and the modern Esdud, on the Mediterranean, midway between Gaza and Joppa. Though nominally a possession of the tribe of Judah, it was held by the Philistines, and was one of the seats of the worship of Dagon. A. is mentioned only once in the New Testament (Acts viii. 40). In the 7th c. B.C., the Egyptians under Psammetichus captured it after a blockade of twenty-nine years. The Romans, on their conquest of Judæa, restored A., which had been lying in ruins since its destruction by the Maccabees about the middle of the 2d c. B.C. It is now an insignificant village.

Az'ov, a fortified town in the government of Jekaterinosslov, Russia, on the most southern of the thirteen arms of the Don delta, 20 miles from its mouth. Until recently it was supposed to be the place founded by Greek colonists as Tanais, but undoubted remains of Tanais have been found near Nedvidovka, on the N.E. arm of the Don delta. In the 13th c. it was occupied by the Genoese, under the name of Tana. Timur took it in 1395, and in 1471 it was seized by the Turks. After a protracted struggle it was ceded to Russia in 1774. It was formerly

a place of wealth and importance, but the gradual deposit of mud at the mouth of the river has greatly reduced its trade. Pop. 10,945.

Azov, Sea of (anc. *Palus Mæotis*), a large gulf in the N. of the Black Sea, from which it is almost cut off by the peninsula of the Crimea. It is about 14,000 sq. miles in extent, receives the river Don at its N. end, and communicates with the Black Sea by the narrow strait of Kertch. Its waters are shallow, and from its abundance of fish the Turks call it Balük-Denis or Fish Sea. At the time of the Crimean war it was occupied by an expedition of the allies (1855), which stopped the supplies for Sebastopol and stormed the ports. Along the coast of the Crimea extends a series of swamps, broken by shoals and sandbanks, called the Putrid Sea (*Sivash*), separated from the Sea of A. by the Tongue of Arabat, a long sandy spit.

Az'toca, the dominant tribe in Mexico from the beginning of the 13th c. till the Spanish conquest in 1519. See MEXICO.

In 1853 two children, a male and a female, said to be descended from the A., were exhibited in Britain by an American, who affirmed that they had been brought from Iximaga, an ancient city of Central America, where they had been venerated as deities. His story was a transparent fabrication. The children, who were less than three feet in height, and of low intelligence, especially the male, were pronounced by Professor Owen to be mere dwarfs. They were doubtless mere Indian cretins. The Aztec children, for a time popular attractions, soon ceased to excite interest.

Azu'a, a town 60 miles W. of St Domingo, island of San Domingo, W. Indies. Pop. 6000.

Azu'a'ga, a town of Spain, province of Badajoz, the centre of a grain-producing country, diversified by oak forests. Pop. 6400.

Azu'ni, Dominico Alberto, an eminent jurist, born at Sassari, in the island of Sardinia, August 3, 1749. His special study was maritime law, which he attempted to reduce to fixed principles in his *Sistema Universale dei Principi del Diritto Marittimo dell' Europa* (Flor. 1795), which he subsequently turned into French under the title of *Droit Maritime de l'Europe* (Par. 1805). The ministry of Napoleon charged him with the preparation of the maritime portion of their new commercial code. He was appointed President of the Court of Appeal at Genoa in 1807. Some time after the fall of Napoleon he retired to Sardinia, and was made by King Carlo Felicio judge of the Consulate and University Librarian at Cagliari, where he died 23d January 1827. Among his other writings may be mentioned *Dizionario Universale Ragionato della Giurisprudenza Mercantile* (Legh. 1786-88); *Histoire Géographique, Politique et Naturelle de Sardaigne* (Par. 1802); *Mémoires pour Servir à l'Histoire des Voyages Maritimes des Anciens Navigateurs de Marseille* (Gen. 1813); *Recherches pour Servir à l'Histoire de la Piraterie* (Gen. 1816).

Azure (It. *azzurro*, *azzuolo*, blue colour, from Pers. *laur*, seen in *lapis lazuli*, the sapphire of the ancients), in heraldry, signifies one of the colours used in blazonry. In the engraving of arms it is represented by horizontal lines.

Azurine (*Leuciscus caruleus*), or 'blue roach,' a species of fishes belonging to the family of Carps (*Cyprinidae*), and nearly allied to the chub, dace, and roach. It occurs in the Swiss lakes, and also in certain fresh waters of Lancashire (*Yarrell*).

Azurite, the blue carbonate of copper, or blue malachite, a valuable ore of copper. It occurs in very beautiful azure-blue crystals at Chessy, near Lyon, on which account it is sometimes known as Chessy copper or Chessylite. It is found in the Cornish and Devonshire mines, at Matlock, and in the Leadhills, Scotland, besides many foreign localities, associated with other forms of copper ore. The name A. has also been given to lazulite, a mineral composed of phosphate of alumina and magnesia.

B.



the second letter in the Hebrew or Phœnician alphabet, and in all alphabets which have been derived from it. In Hebrew it is called *beth*, of which the Gr. *beta* is only a modification, a word signifying house, and entering into the composition of many Scripture names, as Bethel, 'house of God'; Bethlehem, 'house of bread,' &c. The name points back to a time when the language was hieroglyphic or pictorial, and when a rude outline of a house or tent was the symbol used to represent the letter. In the classification of consonants, B belongs to the order of labials or lip-letters, so called from the organ by which they are pronounced; and in the subdivision of labials it ranks as a medial or flat. On examining the Aryan family of languages, it is found that the English B is represented in Latin by *b*, as Eng. 'bear,' Lat. 'ferre,'—Eng. 'be,' Lat. 'fui,'—Eng. 'beech,' Lat. 'fagus,' &c.; in Gr. by *ph* or *p*, and in other members of the family by other labials. The phonetic law which regulates this change will be explained under the heading GRIMM'S LAW. As a sign of abbreviation B. is not much used; the most frequent case is the compound L. B. for *lector benevolus*, 'gentle reader,' or for *beatus*, 'blessed,' applied to the dead.

B, in music, is a note at the distance of a 'major seventh' from C. When truly in time, its vibrations are $\frac{15}{8}$ as fast as those of C below it; upon the pianoforte they are slightly faster. In Germany B \flat is called B, while our note B is called H.

Ba'al, the supreme male deity of the nations of Hither Asia. As a proper name (Heb. *master, owner, lord*), B. means 'the lord' (i.e., of heaven); in the plural (Baalim) it denoted the different modifications under which he was worshipped by the various nations, all being called by the common name B., only distinguished by a particular epithet, and was synonymous with the phrase 'other gods,' as opposed to Jehovah (Jud. viii. 33). He was the sun-god; as distinguished from Moloch (q. v.), the sun in his fertilising operations, the generative and reproductive power of nature.

With regard to the nature of the worship of B. into which the Israelites fell, according to the Book of Judges, soon after the death of Joshua, it is evident, e.g., from the ephod made by Gideon, which was of the same nature as that used in the worship of Jehovah (cf. Jud. viii. 27, and 1 Sam. xxiii. 9, 10), that it did not imply distinct opposition to the worship of Jehovah, but was simply an intermingling of the two. To the early Israelites Jehovah was probably one of many gods, and they imagined they could worship the Baals of the other nations along with him: in Jud. xi. 24, Jehovah and Chemosh are put upon the same level; and the worship of B. and Asherah was carried on in the very temple of Jehovah (2 Kings xxiii.) without any intention of ousting him. This explains the frequent lapses of the people into what the later advocates of a spiritual monotheism regarded as idolatry. The sensuous worship of the Baals of the neighbouring nations (Num. xxv.) was more agreeable to human nature than the Jehovah religion with its demands for sanctification of life.—**B.-berith** (Jud. viii. 33) = 'covenant-B.,' i.e., in covenant with the worshippers.—**B.-peor** (Num. xxv.) = 'B. of the opening,' i.e., of the *hymenem virginum*, a practice in his worship forbidden (Lev. xix. 29).—**B.-zebul**. See BEEI-ZEBUB.

Baalbek, formerly one of the largest, richest, and most strongly fortified cities of Syria, now noted only for its beautiful ruins, situated near the base of Anti-Lebanon, about midway between Damascus and Tripoli, and distant nearly 40 miles from each. It lies at the entrance of a small valley, through which runs a streamlet, divided into numerous rills for the purpose of irrigation. The name Heliopolis, given to it by the

Seleucidæ, is a translation into Greek of B., the 'city of Baal,' the sun-god, doubtless the original Semitic name of the place, and which it probably recovered after the Arab conquest of Syria. The chief ruins are the Temple of the Sun, a smaller building known as the Temple of Jupiter, and a mixed Ionic and Corinthian edifice, at one time used as a Christian church. Although a flourishing city at an early date, and an emporium of trade between the Levant and Inner Asia, next to nothing is known of the history of B. previous to the time of Julius Cæsar, who made it a Roman colony. The Emperor Trajan twice consulted an oracle at B. in the 2d c. A.D., and the great temple was rebuilt by Antoninus Pius. This temple is said to have been converted into a Christian church in the reign of Theodosius. The Arabs sacked B. in 748. In 1401 it was pillaged by Timur, and in 1759 was reduced to ruins by an earthquake. Pop. (1873) 500. See Wood and Dawkin's *Ruins of B.* (Lond. 1757), Volney's *Voyage en Syrie* (5th ed. Par. 1822), and Bâdeker's *Syrien und Palæstina* (1875).

Bâbâ, the Turkish form of *papa* (comp. Syr. *Abba*, q. v.), an onomatopœic word framed by children in their first attempts to speak. It is prefixed as a title of honour, both in Turkey and Persia, to the names of eminent ecclesiastics, particularly to such as are famous for their ascetic mode of life—e.g., B. Nasibi (a Persian poet who died 1537)—and also as a title of courtesy in other cases. In Hindustani *bâbâ* signifies 'prince,' but in ordinary life has the force of the English 'sir.'

Baba, Cape (anc. *Lectum*), a rocky promontory forming the most westerly point of Asia Minor, 86 miles N. of Smyrna. On the headland stands the small town of B., near which is the ruined city of Assos.

Babadag', or **Babatag**, a town of Turkey, in the province of the Danube, situated near the mouths of the Danube, 280 miles N. of Constantinople. It is the chief place of trade in the Dobrudscha, and has a port on the Black Sea. Pop. (1871) 10,000. In most of the Russo-Turkish wars, B. has been the rendezvous and headquarters of the Turkish force. B. is also the name of a peak in the S.E. of the Caucasus, 12,640 feet high.

Babb'age, Charles, F.R.S., an eminent mathematician, was born December 26, 1792, at Teignmouth, in Devonshire, took his degree of Bachelor at Cambridge in 1814, was Lucasian Professor from 1828 to 1839, and died October 18, 1871. Of his works, the principal are the *Differential and Integral Calculus*, the *Decline of Science* (1830), *On the Economy of Manufactures and Machinery* (1832), *Tables of Logarithms* (1834), besides various other treatises and papers read before scientific societies. B.'s great inventions are his *Calculating Machines* (q. v.).

Babb'lers (*Timalina*), a sub-family of Perching or Insectorial birds, included in the Icthyrostris section of that order, and distinguished by the long bill with the ridge of the upper mandible curved, by the slightly-notched tip of the bill, by the nostrils being situated in a groove at the base of the upper mandible, by the rounded form of the wings, by the tapering tail, and by the larger size of the claw of the hinder toe. The B. are all of small size, and are confined to India, Australia, and the islands of the Eastern Archipelago. The best-known species are the laughing thrush (*Pterocylus cachinnans*) and laughing crow (*Garrulax leucolophus*) of India, the Indian black-faced thrush (*G. Chinensis*), the Australian *Cinclosoma punctatum*, &c.

Babel, Tower of, according to the 11th chapter of Genesis, was a structure of brick on 'a plain in the land of Shinar,' and the ruins of which are probably those at Birs Nimrud, to the S.W. of Hillah, near the Euphrates. The most accurate measurement of the tower, supposed to be identified with it, makes the circumference 762 yards, with a conical elevation on the western side of 198 feet. The bricks, which are fire-burnt, bear inscriptions,

and even at this day are so firmly embedded in the mortar, that to extract one is an affair of difficulty. The top of the cone has been vitrified by the action of fire, conjectured to have been lightning—a fact singularly in accordance with the tradition of its original destruction, though the mode of this is not indicated in Genesis. Mr George Smith has deciphered among the Assyrian tablets of the British Museum the legend of the building of the T. of B., and has described it in his *Chaldean Account of Genesis* (Lond. 1875).

Bab-el-Man'deb, 'the Gate of Tears,' so called from the dangers to light craft attending its navigation, the strait which connects the Red Sea with the Indian Ocean; also the name of a lofty cape (the ancient *Palindromos*) in the vicinity, opposite the Abyssinian coast, at a distance of 20 miles. Perim (q. v.), an island in the strait, on which the English have recently erected a fort, separates the channel into the Little Strait, on the Arabian side, and the Great Strait on the African. The Eight Brothers are eight small islands, or rather rocks, situated near the W. coast.

Bab'ber, or **Babûr** (in full *Zuheir-ed-dîn-Mohammed-Baber-Padishah*), founder of the Mogul dynasty in India, was the son of Omar-Shaikh-Mirza, a descendant of Timur, who ruled the petty kingdom of Kokan or Ferghana, in the N. E. of Transoxiana, and who died about 1493. B. had a severe struggle with the neighbouring princes to retain possession of his paternal dominions, but in the end he was successful, and in 1497 found himself master of Samarcand. More formidable enemies then appeared in the Usbeks, led by their Khan Shahilek, who crossed the Oxus and wrested Samarcand from B. Although this important city was recovered by him in 1500, B. was again defeated and forced to seek refuge in Persia. He then made himself master of Cabul, and after an unavailing attempt to win back his native state, turned his attention to India—by celestial inspiration says the courtly historian Abul-Fazl. First of all, however, he set himself to the reduction of Candahar and the rest of what is now known as Afghanistan, and it was not till 1524 that he made a serious attack on the region E. of the Indus. The great battle of Paniput (q. v.), fought on the 21st of April 1526, secured him possession of the empire of Delhi. A second triumph over the Rajah of Oudipore in 1527 obtained for him the title of *Ghazi* or Defender of Islam. Subsequently he reduced the sovereigns of Malwa and Bengal; but his intemperance, particularly in wine, shortened his life, and he died 26th December 1530. The chief authority for his career is the *Vakiati Baberi* (Memoir of Baber), translated into English in 1826 by Erskine and Leyden. The work is divided into two parts, the first giving, among other things, a variety of sketches of those princes who were contemporaries and neighbours of B.; the second, which is in the form of a journal, containing the autobiography of B., with interesting details about Hindustan, Cabul, &c.

Babeuf, **François Noël**, a French political writer, born in 1764 at St Quentin, department of Aisne. For his vehement advocacy of the principles of the Revolution in *Le Correspondant Picard* of Amiens, he was tried at Paris, but acquitted, 14th July 1790. He was again tried at Paris in 1794 for advocating in *Le Tribun du Peuple*, under the signature of *Caius Gracchus*, the absolute equality of all men. A plot to which he had lent himself to re-establish the democratic constitution of 1793 being discovered, he was seized, tried, and condemned, 24th

May 1796. When his sentence was pronounced, he stabbed himself under the eyes of his judges. On the following day he was brought to the scaffold in a dying state, and guillotined. His communistic clime was promulgated with the obstinacy of a fanatic, who was the slave of a single and a senseless idea. See F. Buonarrotti, *Conspiration pour l'Égalité, dite de B.* (Par. 1828, 2 vols.).



Babillard.

Babillard, the term applied to an incessant bird (*Currucula garrula*), better known by the names of 'white-breasted fauvette,' 'lesser whitethroat,' and 'nettle-creeper.'

Babington, Antony, a Derbyshire gentleman, who with thirteen other young Catholics, most of them connected with the household of Elizabeth, conspired to kill the English queen, and release Mary Queen of Scots. The murder of Elizabeth was undertaken by one Savage, while B. entered into correspondence with Mary, and received in return letters that bore to be from her, and approving of the entire plot. But plot and approval passed alike through the hands of Walsingham, Elizabeth's secretary, who had B. and six of his accomplices brought to trial, and condemned on their own confession. They were executed, September 20, 1586. The correspondence was held to reveal Mary's guilt, and the justice of her execution four months later was based mainly on her implication in B.'s plot. To the last she denied all knowledge even of the letters ascribed to her, and many have thought that Walsingham forged them himself, that he might with some show of justice dispose of one whose life was a standing menace at once to Elizabeth and to English Protestantism.

Baboon (*Cynocephalus*), the name applied to a genus of monkeys included in the section *Catarhini* of the order Quadrumana. The baboons are confined to Africa and Arabia, the latter country being zoologically 'African' in its character. These monkeys are regarded as the lowest or most brute-like forms of the true apes. They possess a short or rudimentary tail. The nostrils are oblique and set closely together. The head is of large size; the jaws being prolonged to form a dog-like muzzle, from the possession of which the generic name *Cynocephalus* ('dog-headed') has been derived. The facial angle in the baboons is about 30°. The skin of the nates or hips is destitute of hair, and assumes a hoary consistence, constituting the so-called *natal callosities*, and these in some baboons (e.g., mandrill) may be brightly coloured. In the mandrill the cheeks are also striped red and blue. The teeth correspond in number to those of man, but the incisors, and especially the canine teeth, are large and projecting. The baboons are mostly of large size. They employ the fore-limbs in running more frequently than any of the other quadrumana. Cheek-pouches, in which food may be temporarily stored, exist in these forms. The baboons are generally fierce in nature, and more unamiable than other species of monkeys. They live chiefly on fruits. They approach man's structure most nearly of all the apes in the sigmoid curve of the spine; in the concavity of the sacrum; in the convexity of the nasal bones; in the transverse breadth of the pelvis when compared with its depth from the sacrum to the pubis; and in the length of the foot when compared with the length of the spine, &c.



Mandrill.

The best-known species of baboons are the common B. (*Cynocephalus papio*), the derrias (*C. hamadryas*), the chacma (*C. porcarius*), the mandrill (*C. maimon*), and the drill (*C. leucophaeus*). The two latter forms occur chiefly in Guinea, and are avoided as fierce and predatory in habits.

Bab'rius, a Greek choliambic poet, who flourished probably in the 2d or 3d c. of the Christian era, and turned the fables of *Æsop* into verse. His work formed the basis of succeeding collections, that of Maximus Planudes, for instance, being evidently a prose rendering of the work of B. Bentley (q. v.) first pointed this out in his *Dissertatio de Babrio*, and it was still more clearly shown by Tyrwhitt in 1778. The edition of Knoche (Halle, 1835) contained all of B. then known; but in 1844 there was published at Paris, by Boissonade, a collector of 123 hitherto unknown fables of B. from a manuscript discovered in a convent on Mount Athos by Minoides Minas, a Greek in the service of the French government. Among the best of later editions are those of Lachmann (Berl. 1845), Lewis (Oxf. 1846-59), and Weise (Leips. 1855). See also Eberhard's *B.* (1865).

Babylon, **Babylonia**, a city and country of that flat region of W. Asia watered by the Euphrates in its lower course, and by the Shat-el-Arab, the combined stream of the Euphrates and Tigris. The city, known variously as Babylon and Babylonia, was in the days of its greatness of vast size, and occupied a site at least near to the Babel (q. v.)

of Genesis, of which B. is a Græcised form. The etymology is disputed, some contending that Babel owes its name to the circumstance of the confusion of tongues having occurred there, while others, with greater probability, interpret it as implying the gate or court of Bel, or Belus, the chief Babylonian deity. No mention is made in Scripture of Babel or Babylon from the confusion of tongues till the reign of Hosea, about 730 B.C., when the Samaritans were carried captive thither; and it is more than probable that it did not rise early into importance, but was long tributary to Nineveh. The first who brought the city into prominence was Nabopolassar, the father of Nebuchadnezzar, and the conqueror of Nineveh, who transferred the seat of government of Western Asia from Nineveh to B. But its glory was not of long duration. Though in the reign of Nebuchadnezzar it was, perhaps, the most splendid city in the world, yet in less than a century it was forced to surrender to Cyrus, and was shorn of all political greatness. The only trustworthy description we have of ancient B. is that of Herodotus, who speaks apparently with the precision and authority of an eye-witness, though the magnitude he ascribes to it has caused some to question his accuracy. The form of the city was an exact square; the streets ran at right angles to each other; there were a hundred gates of brass; and among its most remarkable structures were the brazen-gated temple of Belus, the royal palace, and the bridge over the Euphrates, with the castle forts at each extremity—structures, the erection of which, despite the magnitude assigned to them, is not incredible under a despotism where labour could be enforced by the monarch. The Scripture narrative of the capture of B. by Cyrus, and of the slaughter of Belshazzar, is brief but picturesque. The city never recovered its former splendour, though the reigns of Darius and Xerxes were not without magnificence. Alexander the Great found the temple of Belus in ruins, and wished to restore it to its ancient splendour. But the task exceeded even his energy and resources, and he did not succeed in clearing away the rubbish, though he employed 10,000 men in the work. As late as the reign of Augustus, a portion of B. was still inhabited, the remaining area being under cultivation. The ruins of Babylon were described by Mr Rich in 1811, and by Sir Robert K. Porter in 1818, with no substantial discrepancy. Mr Rich's narrative was questioned by Major Rennell, but in a reply published in 1817, Mr Rich was considered to have vindicated his accuracy satisfactorily.

The boundaries of the province of Babylonia, which is generally termed in Scripture the land of the Chaldees, cannot be strictly determined, as at different times they varied considerably. But the geographers of Rome described it as separated on the N. from Mesopotamia by the Median wall, and bounded on the E. by the Tigris; on the S. by the Persian Gulf, and on the W. by the desert of Arabia. The inhabitants, though for the most part designated Babylonians, are not unfrequently termed Chaldeans, but it is probable that these did not represent a distinct nationality, but simply a superior native caste. B., in consequence of its position between two large rivers, and its flatness (there being no elevations of consequence), was from the earliest times celebrated for its fertility, producing grain yielding in ordinary years two-hundred-fold, and in the best years three-hundred-fold. Trees were scarce. Of these, the date-palm was the most abundant, and from this the natives manufactured a heady wine, of which Xenophon makes mention in the *Anabasis*; indeed, the serviceable qualities of the date-palm were evidently exaggerated, Strabo describing it as supplying the natives with bread, honey, wine, and vinegar, and even textile materials. The weeping-willow (*Salix Babylonica*) is, despite its name, not only not a native of B., but is not grown there. An incontrovertible proof of the fertility of the district is presented by Herodotus, when he narrates that it furnished a third of the produce of the whole dominion of the Persian king. This excessive fertility was in great measure due to the excellent means of irrigation furnished by the two great rivers and their connecting canals. These were not formed by depressions in the land, but were contained in aqueducts constructed on the surface, the water being forced into them by dams, as into modern mill-races. Canals were also converted into means of defence against enemies, and to prevent invasion; of these, the most celebrated was that constructed by Queen Nitocris, which consisted of a diversion of the course of the Euphrates, and of which Herodotus has given a particular description. The canals so formed, and which Xenophon de-

scribes in the *Anabasis*, were large enough to carry provision-ships; two others (according to Ptolemy, Arrian, and other writers) were used as outlets into the sea for the superfluous waters of the Euphrates.

The general depression of the country, traversed by two full-flowing rivers, tends to the formation of marshes. These produce luxuriantly reeds and rushes; are the favourite haunts of buffaloes, and when partially dried in summer, furnish splendid crops of rice. As these marshes form natural reservoirs for the waters of the Euphrates, they have the unusual effect of making its lower occasionally narrower than its upper reaches, diminishing in places from 200 to 60 yards of breadth, though they afterwards resume their former proportions. One thing is noticeable in connection with B., that the accounts of modern travellers, so far from conflicting with those of the ancient authors, in almost every instance confirm them.

The Babylonians were members of the Aramaic branch of the Semitic family. According to the writer of Genesis (x. 10), Nimrod, son of Cush, founded the kingdom of Babel, a distinction, however, claimed by Greek historians both for the god Bel and for the mythical Semiramis. The early history of B. is involved in great obscurity. The so-called Chaldean period begins 2234 B.C., and closes 1273 B.C. From this date till 747, B. was dependent on Assyria. In 604 the seat of empire was transferred from Nineveh to Babylon; in 538 Cyrus took the city, and Babylonia became a Persian satrapy. The downfall of the Persian monarchy brought B. under the dominion of Alexander the Great, who died there 323 B.C. The Romans held it temporarily more than once. It came into the possession of the Arabs in 650, and since 1638, when the Turks wrested it from the Persians for the second time, it has formed part of the Ottoman empire in Asia.

Under Babel, an account has been given of the vast brick-mound of Birs Nimrûd; but the explorations of successive travellers have brought to light others scarcely less important,—an irresistible proof of the greatness of the early civilisation of the 'land of Shinar,' and of the magnitude of the works undertaken and completed by its rulers. Among the writers on this subject are Rich, *Babylon and Persepolis*; Porter, *Travels*, vol. ii.; Ainsworth, *Researches in Assyria*; Chesney, *Expedition for Survey of the Euphrates*; Rawlinson, *Journal of the Asiatic Society*, vol. xii.; Rawlinson, *Herodotus* (Lond. 1858); Oppert's *Expedition Scientifique en Mésopotamie* (Par. 1863), whose book marks a new era in the discussion of the subject; and Ménant's *Babylone et Chaldée* (Par. 1875).

Babylonian Captivity. In B.C. 588 Nebuchadnezzar, after the capture of Jerusalem, carried off to Babylonia Zedekiah, King of Judah, the chief inhabitants of the city, and indeed all Judah, except 'the poor of the land' (2 Kings xxv. 12). Their captivity, which lasted only fifty years, seems to have been attended by many ameliorating circumstances, for the captives lived according to their own law, and were indulged in the exercise of their religion. Their hopes of the Messianic kingdom were also raised and confirmed by the prophetic utterances of Ezekiel (Ezek. xxxvii. 20-28). On the conquest of Babylon by Cyrus in 538 B.C., liberty was given to all the Jews to return to their country. This applied also to the descendants of the ten tribes of Israel, who had been carried off long before (B.C. 722) by the Assyrian king Salmanassar, but only the 'Jews' proper, that is, the tribes of Judah, Benjamin, and Levi, availed themselves of the privilege. The other tribes, though frequent attempts have been made to identify them with existing races (Kurds, Afghans, American Indians), have not as yet been discovered.

Babyroussa Hog (*Sus Babyroussa*), a genus of the Swine family (*Suidæ*) inhabiting the islands of the Eastern Archipelago and the Malayan Peninsula, and allied to the wild boars (*Sus scrofa*) of Europe. The upper canine teeth in this form are of very large size, and are curved backwards, those of the males piercing the upper lip. The legs are elongated and of slender make.



Babyroussa Hog.

Bacchiglio, a river of Venetia, N. Italy, rises in the Alps, passes Vicenza and Padua, and enters the Adriatic 3 miles S. of Chioggia, after a course of 90 miles, of which 30 are navigable.

Bacchus (the Gr. *Dionysos*), the god of wine, and according to the most popular version of the varying myth, the son of Zeus and Semele. Before his birth, his mother, artfully instigated by the jealous Hera, requested Zeus to visit her in the full splendour of his godhead. The god, who had sworn by the Styx to grant her whatever she should ask, reluctantly consented, and Semele was consumed by lightning. B., then six months old, was enclosed for three months in his father's thigh, and some time after his birth he was consigned to the charge of the nymphs of Nysa, in Thrace, where he first taught men the cultivation of the vine. He afterwards travelled as far as India to disseminate his discovery, and was everywhere hailed as the benefactor of mankind. His worship, introduced into Greece by Melampus, was celebrated with music and song, and those who opposed it were punished by the god with madness and metamorphosis. His type in works of art varies much. Sometimes he is represented as an effeminate youth; sometimes as a man in years with a sweeping beard, and known as the Indian B.; sometimes as a warrior, having for his shield a panther's hide; and sometimes even with horns. It is in the youthful form that he is essentially the god of wine. The chief seat of his worship in Greece was Boeotian Thebes, the offering consisting of goats and oxen, and especially rams. He was associated with Demeter in the celebration of the Eleusinian mysteries, and his worship was also occasionally conjoined with that of Apollo. His festivals, observed at the vintage season, were occasions of excessive hilarity. Of these, the lesser Attic Dionysia, one of the most striking amusements of which was the Askolia, or leaping of the young on full smeared wine-skins, were accompanied with dramatic entertainments, and a banquet at the expense of the state. The great Dionysia were distinguished by the representation of new comedies and tragedies, whence B. is sometimes mentioned as the god of the theatre. The Triateric Dionysia, celebrated, as the name imports, every third year, are first met with in Boeotia, and were always distinguished by the nocturnal orgies of *Mænades* or *Bacchantes*, clad in the skins of fawns, and swinging the thyrsus with the wildest excitement and gesticulation. The worship of B., introduced from Greece into Rome, 496 B.C., where after a time it grossly degenerated, and at last was accompanied with rites so impure, that the senate, 186 B.C., after stringent inquiry, prohibited the *Bacchanalia* under severe penalties.

Bacciocchi, Marie-Anne-Elise Bonaparte, born at Ajaccio, Corsica, in 1777, was the eldest sister of Napoleon I. At Marseille, when twenty years of age, she married Felicio Pasquale Bacciocchi, a Corsican in the service of France, and rising with her brother's good fortune, in 1809 she was made Grand Duchess of Tuscany; but her administration was arbitrary and unpopular. She left Florence in 1814, on the fall of Napoleon, and died at Villa Vicentina, near Trieste, August 7, 1820. Her husband died 28th April 1841. Their daughter, **Napoléone Elise B.** (born 1810), was remarkable for her devotion to Napoleon's son, the Duke of Reichstadt, whom she is said to have nearly carried off from Austrian custody. In June 1825 she married Prince Camerata, from whom she was separated in 1830, and died in Normandy, February 3, 1869.

Baccio della Porta, otherwise **Fra Bartolomeo di San Marco**, from his having resided some time in the monastery of St Mark of Florence, born in 1469 at Savignano, Tuscany, was a distinguished painter of religious subjects. From Leonardo da Vinci he learned the art of effective colouring, and he acquired just notions of perspective from his younger contemporary, Raphael. B. died in 1517 at Florence, and in the Pitti Palace in that city his finest works are preserved. His 'St Sebastian' is much esteemed.

Bach, Alexander Anton Stephan, Baron von, an Austrian politician and statesman, born 4th January 1813, at Loosdorf, Lower Austria. After completing his education in law he entered the imperial service, and soon perceived the necessity of organisation of the empire. During the disturbances that followed the French revolution of February 1848, his known integrity and ability procured his election as one of the representatives of Lower Austria in the central commission of the provincial states. While strongly opposing the entry of the Austro-Germanic provinces into the German confederation, he advocated the recognition of their right to exercise a greater parliamentary influence on public affairs. He also proved himself a

zealous law-reformer. His determined opposition to the recognition of the independence of Hungary, made him so much an object of suspicion and dislike to the democratic party, that he deemed it prudent, in 1848, to retire temporarily from public notice; but a change of government having occurred, he became Minister of Justice; in May 1849 he was made Minister of the Interior, in which office he carried on the work of centralisation begun by Stadion, organised the political administration of the crown lands, and took part in drawing up the *Concordat* with the Pope. From 1859 to 1870 he was Austrian plenipotentiary at Rome.

Bach, Johann Sebastian, the greatest of the older German composers, belonged to a family originally Hungarian, but settled in Thuringia since the beginning of the 17th c., and was born at Eisenach, Saxe-Weimar, 21st March 1685 (the year also of Handel's birth), became court-organist at Weimar in 1708, concert-master in 1715, and cantor and musical director at Leipzig in 1723. B., who never left his native country, died 28th July 1750. He had four sons, all of them eminent for their musical gifts. Much of B.'s finest music was written for the German Protestant Church, his compositions for which include *five entire series* of cantatas for all the Sundays and holidays in the year, numerous motets, and at least two sets of 'Passions-musik.' His greatest choral work is his 'Matthew-Passion,' for performance in the Lutheran Church on Good Friday evenings. It is a kind of oratorio, at once most dramatic and most solemn, and describes the events related in the 26th and 27th chapters of Matthew in the words of the text, interspersed with comments upon them in the form of hymns and chorales. Nowhere does Bach's genius appear greater than in his treatment of the *chorale*, the German hymn-tune. 'These old melodies, as harmonised by him, seem to be transfigured. In appearance the under parts are as formal and heavy as the chorale itself (which is in the soprano); but when once they are heard, all the formality disappears; you are unconscious that what you listen to is written in conformity to a hundred artificial rules; you hear only the great soul of the most religious of musicians pouring out its noblest thoughts, and are lifted unresistingly into some calmer, serenest atmosphere, above all the littleness and commonplaces of life.'

The most widely known of B.'s works are his forty-eight preludes and fugues for the pianoforte (entitled *Das Wohltemperirte Klavier*), and the gavottes, bourrees, and other dances from some of his orchestral suites, &c. Mendelssohn was an enthusiastic admirer of B., and did much to revive his music; and his endeavours have been well followed up by the living representatives of the more advanced school of music. See the biography of B. by Bitter (1865).

Bacharach (Lat. *Bacchi Aræ*), an old town in the division of Coblenz, Rhenish Prussia, on the Rhine, with some river trade. Blucher here crossed the Rhine, 1st January 1814. The vicinity is noted for its wine. Pop. (1872) 1687.

Bachelor, a man who has never been married. The etymology of the word is uncertain, most probably it is connected with the Latin *baculus*, a stick, and conveys the notion of a transition or shooting forth (like a branch or twig), from a lesser to a more advanced condition. Ducange in his *Glossarium ad Scriptores Medie et Infime Latinitatis* (3 vols. Par. 1678) enters very fully into its various applications. It was given to ecclesiastics, scholars, and knights in the first grades of their professional discipline. As an academical title, B. appears to have been first used in the theological classes of the University of Paris in the 13th c. The condition of bachelorship was in ancient times viewed with disfavour by the community, the laws of Greece and of Rome imposing penalties and disabilities on unmarried men; and latterly, the laws of Rome imposed penalties on unmarried women also. Widows were allowed but one year to mourn; and the legatee was obliged to marry within a hundred days of the testator's death, or else he forfeited his legacy. However inexpedient it may seem to us that men and women should be obliged to marry under the penalty of disabilities, it will probably be generally admitted that there is at least a strong argument in favour of an extra taxation of bachelors relatively to that of married men, the latter having usually several to provide for, while the former has commonly but himself. And this principle has in times not yet old been recognised in England. In the reign of William

III. bachelorship and widowhood were taxed for the purpose of carrying on the war against France; and the servants of bachelors were put under extra taxation by Mr Pitt in 1785. Yet there is another side to the question. The tendency of human nature is not towards undue delay in marriage, but the reverse. There can be no doubt that the enormous infant mortality which prevails in the civilised world generally, is mainly owing to marriages in which the couple have not means properly to support a family. The mortality registers, and the labours of our actuaries and other men of science, give useful and interesting evidence of the varying force of the prudential check to marriage in different countries and places. See **VITAL STATISTICS; LIFE, MEAN DURATION OF.**

Bachelor, Knight. Those who have the dignity of knighthood conferred on them, without being placed on any order, are called K.B. Knighthood of this kind is now only conferred in Great Britain. The honour is not hereditary. See **KNIGHT.**

Back, a maritime expression of many technical meanings and applications. To *back and fill*, is a mode of tacking with the tide, and against the wind. To *back the sails*, is so to arrange them as to make the ship move stern first; and when any sail is *backed*, the effect is to slacken the speed at which the vessel is progressing.

Back, Sir George, born at Stockport in 1796, and for five years a prisoner of the French in the wars with Napoleon, was associated with Franklin in his voyage in the *Trent* (1818), his expedition to Coppermine River and Fort Chippewayan (1819), and in that of 1825-27, when B. was left in charge of Fort Franklin. B.'s most important voyages were those of 1833-35, when, starting in search of Ross, he discovered Artillery Lake, and followed the Oot-koo-hi-ca-lih (Great Fish River, called also after him, Back River) to its mouth, and of 1836-37, when he brought the *Terror* through terrible difficulties off Northampton Island, obtaining for this the gold medal of the Geographical Society. He published in 1836 an account of his voyage of 1833, and in 1838 *Narrative of an Expedition in H.M.S. Terror*. B. was a Vice-President of the Royal Geographical Society, and President of the Arctic Committee. He died June 23, 1878.

Backergunge (*Bakarganj*), a ruined village of Bengal, British India, 12½ miles E. of Calcutta. It was capital of the district of B. till 1801, when the seat of government was removed to Burisaul. The district of B., intersected by many streams of the Ganges and Brahmaputra, produces rice, sugar, cotton, &c. In 1876-77 the registered exports by boat were valued at more than a million sterling; the imports at £823,000. Area, 4066 sq. miles; pop. (1872) 1,874,201. On Nov. 1, 1876, the Sundarbans portion of the sea-board was swept by a terrible storm-wave, and multitudes of lives were lost.

Backgammon (Old Eng. *bacc*, back, *gamen*, game), a game of chance played by two persons, upon a table divided into twelve points, coloured alternately, six white and six black. There are two sets of fifteen pieces or men, one set white, the other black; also two dice and two dice-boxes; the dice common to both, while each player uses his own box, and the throws are alternate. The sides of each die are marked with dots, counting from 1 to 6, and called *ace*, *deuce*, *tre*, or *trois*, *quatre*, *cinq*, *six*; at each throw of the two dice any number may turn up, from 2 to 12—doublets counting double; that is, both dice being the same number, each is twice its value, two deuces, for example, counting not 4, but 8. The numbers uppermost on the dice refer to points on the tables, on which the men are placed in an order prescribed by the rules of the game. The object of a player is to get his set of men, white or black, round into the half of the table which contains the ace-points, removing them from point to point according as the dice turn up; the dots may be reckoned separately or collectively—that is, a tre and a cinque would warrant the moving of one man 3 points, and another 5; or, provided a point be open to suit the move, one man may be advanced 8 points. No point can be moved to if it is covered by two men belonging to the other player. If the point indicated by the dice is a 'blot'—that is, if it is covered by only one man—the man can be removed and its place taken by the one which has secured it; and the removed man remains out of the game till the dice turn up a point corresponding to one which is open on the other player's table. When restored, it has to be worked round like the other pieces in the set to which it belongs. There are two

kinds of victory—a hit and a gammon, two hits reckoning equal to one gammon. To win by being the first to play the men off the points is a hit. When the other player has one man out, to win before he gets it replaced is a gammon. As in whist, two games won out of three is a rub.

Backhuysen, or Bakhuyzen, Ludolf, a famous Dutch marine painter, born 1631, at Emden, died at Amsterdam, 1709. He was remarkable for the devotion and assiduity with which he studied from nature. Storms called him out to sea, in his small boat, to sketch and observe. The result was, that for truthfulness his pictures took the first rank. His best work was bought for 1300 florins and presented to Louis XIV., and this, together with seven other examples of his manner, may still be seen in the Louvre. His grandson, also named Ludolf, first a merchant, then a soldier, and finally a painter, has executed some fine battle-pieces.

Back-Stays, the name given to the long ropes reaching from the topmast-heads to the sides of a vessel, and so attached as to be a support to the masts.

Backwardation. See **EXCHANGE.**

Bacolor, the capital of the province of Pampanga, in the E. Indian island of Luzon, on a canal connecting it with the river Pampanga, 38 miles N.W. of Manila. Pop. 8737.

Bacon, the cured or salted flesh of the domestic pig. Its composition and properties as an article of food will be described under **PORK**, which is the same meat in a fresh state.

Bacon, John, an able sculptor, born in London, 1740. He was trained as a porcelain painter, commenced to model 1763, won the Royal Academy's first prize 1769, and died 1799. He is best known for his monuments of Lord Chatham in Westminster and Guildhall, and his fine statues of Howard and Dr Johnson in St Paul's.

Bacon, Sir Nicholas, father of Lord Bacon, was born at Chiselhurst, Kent, in 1510. After an education at Cambridge, which he improved by foreign travel, he studied law, and, in 1537, was made Solicitor to the Court of Augmentations. In 1546 he was appointed by Henry VIII. Attorney of the Court of Wards, an office which he retained under Edward VI., but was deprived of it by Mary, because he had adopted the Protestant faith. Elizabeth, however, intrusted him with the Great Seal (December 1558), making the appointment by letters-patent, and consequently permanent. Three months later he was called on to preside over the abortive conference held at Westminster to discuss several differences between Protestants and Roman Catholics. He experienced a transient eclipse of the royal favour, from having been supposed accessory to the writing and publishing of a book questioning the title of Mary of Scotland to succeed to the English throne on Elizabeth's death. B. died 20th February 1579, leaving behind him the reputation of a wise councillor, a sagacious statesman, and an honest Englishman.

Bacon, Francis, Lord Verulam, Viscount St Albans, known generally by Pope's characterisation as 'the wisest, brightest, meanest of mankind,' was born in London, January 22, 1561. His father was Sir Nicholas B., his mother was Ann Cooke. From a very early age he showed a keen love of knowledge, and this, taken with his precocious gravity, is said to have made Queen Elizabeth playfully style him her 'young Lord Keeper.' He studied at Trinity College, Cambridge, where, it is said, he acquired his hatred of Aristotelianism, and began to sketch his own scheme of philosophy. Leaving college, he went to Paris, under the care of Sir Amias Paulet, ambassador at the French court. There he occupied himself with diplomacy and scientific investigation until 1580, when the death of his father recalled him to England. After an unavailing attempt to obtain a sufficient provision from government to enable him to pursue his studies in science and literature, he sought to obtain preferment by studying for the law and taking part in court intrigues. His professional promotion was slow. His bright talents excited the alarm of his uncle, Lord Burleigh, then Premier, who saw in him a most formidable rival to his own son Robert. Although B. then paid court to Burleigh's rival, Essex, the latter was not powerful enough to prevent him from being defeated in his contest in 1594 for the Attorney-Generalship. To make up for this defeat, Essex presented B. with an estate at Twickenham worth £2000 a year. Yet B. is found as the chief persecutor of Essex,

both by pen and tongue, for conspiracy against the queen, and although various attempts have been made to explain this away, it is impossible to acquit him of ingratitude. B., who had entered Parliament as member for Middlesex in 1595, rose rapidly in the reign of James I. He was knighted in 1603, became Attorney-General in 1613, in which office he also shows himself in an unfavourable light, as countenancing the torture of an old clergyman of the name of Peacham by the rack; Keeper of the Great Seal in 1617, and in 1619 Lord Chancellor, with the title of Lord Verulam. Next year he was made Viscount St Albans. It seems undoubted that B. abused the high position he had now attained, by taking advantage of his judicial functions to increase his revenues, which, although he had married the daughter of a wealthy alderman, were not large enough to meet his extravagances, and there seems to be no doubt that he took bribes from suitors. The scandal became so great, that neither the king nor his favourite Villiers, to whom he had truckled in the most abject manner, could shield him from popular indignation; a parliamentary inquiry was instituted in 1621; B. confessed to twenty-three acts of corruption, and was sentenced to a fine of £100,000, to be confined in the Tower during the king's pleasure, and to be banished for life from the court and from public employment. Although the fine was remitted, and the imprisonment only lasted two days, B. never returned to public life, but on a pension of £1200 a year devoted himself to literature and science. His death took place in 1626, the common story being that he caught a chill while endeavouring to test the power of snow to preserve flesh. His debts amounted to £22,000.

Considering his lamentable failure in public life, it is to be regretted that B. did not devote himself absolutely to literature and science. As it is, his intimacy with every department of human knowledge except mathematics is marvellous; while few writers have been more eloquent, more imaginative, or more witty. The titles of some of his books, his *Essays*, a moral treatise, his *Advancement of Learning*, considerably enlarged in its Latin form, *De Augmentis Scientiarum*, his *Wisdom of the Ancients*, his *Novum Organum*, meant, like the *De Augmentis*, to form part of a *Magna Instauratio*, or *Great Restoration of Philosophy*, which was never completed, and the *Theory of the Reign of Henry VII.*, themselves show the extent of the field over which he travelled. But great as are his claims to fame as a moralist, an historian, a writer on politics, and a rhetorician, he will be best known as, 'if not absolutely the father of Inductive Philosophy, in the sense of the inventor of the method of interrogating nature by experiment and observation, the populariser of that philosophy.' Mr Spedding says that British Philosophy 'was born about B.'s time, and B.'s name (as the brightest which presided at the time of its birth) has been inscribed upon it:—

"Hesperus, that led
The starry host, rode brightest."

Not that Hesperus did actually lead the other stars; he and they were moving under a common force, and they would have moved just as fast if he had been away; but because he shone brightest, he looked as if he led them. Various editions of B.'s works have been published; by far the best is that of Messrs Spedding, Ellis, and Heath (Lond. 1858-74). The *Novum Organum* has been admirably edited by Fowler of Oxford (Lond. 1878).

Bacon, Roger, an English monk of the 13th c., remarkable for his great scientific and philosophical knowledge, and conspicuous as one of the earliest assertors of the true experimental nature of physics, was born at Ilchester, Somersetshire, in 1214. After studying at Oxford and Paris, he entered the order of St Francis in 1240, and thenceforward ardently devoted himself to chemical, physical, and mathematical science. His experiments and discoveries excited the jealous suspicions of his brother monks, which feeling deepened into one of implacable hatred on his denunciation of their ignorance and immorality. Accused of being a magician, he was confined in his cell, without the privilege of seeing even his friends. He enjoyed a brief space of tranquillity while Clement IV. was pope, but in 1278 he again suffered imprisonment for ten years. B. died at Oxford, June 11, 1292. His great work is his *Opus Majus* (Jebb, Oxf. 1733). According to Whewell, it is 'at once the encyclopædia and the *novum organum* of the 13th c.' He had a knowledge of the nature of lenses, and is held by some to have been the inventor of the telescope; he was extensively acquainted with astronomy and geography; and is supposed to have been acquainted with

the nature and composition of gunpowder. It may be added that his linguistic knowledge was also extraordinary. He had a profound knowledge of Latin, Greek, Hebrew, and Arabic, and ransacked the treasures of antiquity in pursuit of scientific truth. The *Opus Minus*, *Opus Tertium*, and other writings of B., were published by Brewer (Lond. 1859). See also Siebert, *R. B., sein Leben und seine Philosophie* (Marb. 1861); Charles, *R. B., sa Vie, ses Ouvrages, ses Doctrines* (Bruss. 1861); and Green's *Short History of the English People*, pp. 133-36 (Lond. 1875).

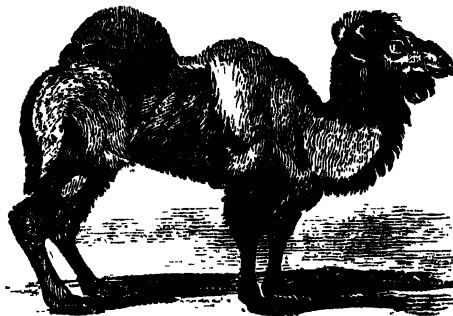
Bacon-Beetle. See DERMESTES.

Bacsan'yi, János, a Hungarian novelist and poet, born May 11, 1763, at Tapolcza, became known at first by his *A Magyarok Vitézsége* ('The Valour of the Magyars,' Pesth, 1785). He worked on the *Magyar Museum* (which he assisted in founding) from 1788 to 1795, and took part later in editing the *Magyar Minerva*. In 1805 he married Gabrielle Baumberg, the German poetess ('Amor und Psyche,' Vienna, 1807). On the capture of Vienna by the French, B., having translated Napoleon's proclamation into Hungarian, was obliged to flee to Paris. He died at Linz, 12th May 1845. B. published a collection of his works at Pesth in 1827, which reached a second edition in 1835.

Bacteria, the name applied to certain microscopic rodlike bodies, which appear in infusions of organic matter, and in fluids exposed to the air. Some naturalists maintain that they are formed by the union of the organic molecules or minute particles of the fluids. B. exhibit independent movements, and probably represent stages in the development of some of the lower forms of plant-life. They are interesting in connection with the subject of SPONTANEOUS GENERATION (q. v.).

Bact'ria, or **Bactria'na**, the ancient name of the district which, though its exact boundaries are uncertain, coincided in the main with the modern Balkh or Afghan province of Turkestan. See BALKH and TURKESTAN. It was to a large extent mountainous, with intervening steppes and sand-tracts, and fertile vales along its numerous diminutive streams. Hence it was well peopled. B., the capital, was the cradle of the old religion of Persia, and the principal seat of the Magi. Zend was the language of the Bactrians, and being akin to the Sanskrit, it is not surprising that on the coins of the Greek kingdom of B. there are not only Greek characters, but characters of an Indo-Scythian dialect, which have been happily deciphered by Prinsep. After the death of Alexander, B. became a province of the Græco-Syrian kingdom of the Seleucidae, but secured its independence under Didotus I. (B.C. 256). See Wilson's *Ariana Antiqua* (Lond. 1841), and Lassen's *Indischen Alterthumskunde* (Bonn, 1849).

Bact'rian Camel (*Camelus Bactrianus*), a species of camel distinguished from the Arabian camel or dromedary by the



Bactrian Camel.

possession of two humps on the back. The native regions of this species lie to the S.E. of Arabia, and extend over Central Asia and China even to India. In Asia, its northernmost limit appears to extend to the 60° of latitude. It occurs in the Crimea, and extends from Arabia westwards to the territory between the Caspian and Black Seas. See also CAMEL.

Bactrites, a genus of fossil Cephalopods or cuttlefishes, belonging to the family *Ammonitida*. The shells of these forms occur in strata ranging from the Lower Silurian to the Devonian formations.

Baculites, a genus of extinct cuttlefishes included in the family *Ammonitida*, the shells forming simple, straight, elongated cones. These forms are found in strata ranging from the Lower Greensand to the Cretaceous rocks, and are most abundant in the latter formations.

Bacup, a flourishing town of Lancashire, 12 miles S.E. of Blackburn, and 15 N. of Manchester, with large cotton factories, brass and iron foundries, and dye-works. It is the centre of a rich coal-mining district, and in the vicinity are extensive woollen factories. Pop. (1871) 17,199.

Badag'ry, a town on the Gold Coast, 315 miles W. of Cape Coast Castle, formerly a centre of the slave trade. It now belongs to Britain, and has some export trade. Pop. 10,000.

Badajoz (a corruption of the Moorish *Beledaiz*, 'land of health,' and the *Pax Augusta* of the Romans), the capital of the province of Estremadura, Spain, about 5 miles from the Portuguese frontier, on the Guadiana, here spanned by a bridge of twenty-eight arches. It is a fortress of the first rank, and the seat of a bishop, with a cathedral containing a magnificent organ and several fine paintings. It lies in a fertile region, and, as one of the keys of Spain, has suffered much from war. The French besieged it thrice (1808, 1809, and 1811), and on the last occasion it surrendered. It was also invested three times by the English under Wellington, twice in 1811, and again in the following year, when it was taken by storm (April 6, 1812), after a fierce conflict and great loss of life, the killed and wounded on the British side amounting to about 5000. B. has manufactures of coarse woollens, soap, and leather, and carries on a considerable contraband trade with Portugal. The celebrated painter 'El Divino' Morales, was born here in 1509. Pop. 22,895.

Badakhshan, a state in Turkestan, Central Asia, lies between the Hindu Kush mountains and the river Amu-Daria (anc. *Oxus*), within lat. 36°–38° N., and long. 69°–73° E. It is a well-watered, richly-cultivated hill country, abounding in beautiful valleys, and covered with extensive woods. The mountain chains contain ruby-mines, and occasional deposits of lapis-lazuli, a mineral chiefly found in this region. The pop. is estimated at 500,000, principally Tajiks, an Aryan people, professing the Mohammedan religion and speaking the Persian language. B. is ruled by a 'Mir,' and may be regarded as an independent kingdom, although it has frequently been annexed to Afghanistan, and is still struggling for independence. B. is also the name of the chief town. See Yule's *Marco Polo* (new ed. Lond. 1875); *Quarterly Review*, April 1873; and *Edinburgh Review*, July 1873.

Bädeker, Karl, whose name at least is known all over the Continent, belongs to an old publishing family originally from Bremen, and was born at Essen, 3d November 1801. In 1827 he started business for himself at Coblenz, and in 1839 published the first of his admirable series of handbooks of travel (now translated into English and French) under the title of *Rheinlande* (18th ed. 1874). It was followed by his *Belgien und Holland* (13th ed. 1875), his *Deutschland und Oesterreich* (16th ed. 1874); *Schwaben* (16th ed. 1875); *Paris und Nord-Frankreich* (9th ed. 1874); *Italien* (3 vols. 4th ed. 1875), &c. B. died 4th October 1859. The business of the firm is now carried on by a younger son, who has continued the series in his *Syrien und Palästina* (1875).

Bad'en, a grand duchy in the S.W. extremity of Germany, about 150 miles long, and from 10 to 97 miles broad, with an area of 5910 sq. miles. It is bounded on the N. by Bavaria and Hesse-Darmstadt; on the E. by Würtemberg and Bavaria; and on the W. and S. by the Rhine, which separates it from Rhenish Bavaria, Alsace, and Switzerland. With the exception of the western portion along the right bank of the Rhine, the country is mountainous, the most prominent range being the Schwarzwald or Black Forest (q. v.), which extends from the Swiss frontier northward through B. and Würtemberg. The portion lying to the N. of the Murg, as far as the Neckar valley, is known as the Neckar highlands. The principal rivers are the Rhine, flowing out of the Bodensee, with its tributaries the Wutach, Wiese, Elz, Kinzig, Acher, Murg, Pinz, Salbach, and Neckar, one of the most beautiful of purely German streams; on the N.E. the Main, on the Bavarian border, with the Tauber, an affluent from Würtemberg; and in the S.E. the Danube.

Besides the Bodensee, the largest and the finest of German lakes, there are in the Black Forest numerous small lakes or tarns, as the Zellersee, Titisee, Feldsee, and Mummelsee.

Owing to the great variations in altitude, the climate of B. presents considerable variety; and consequently there is a great diversity in the produce. There are vegetables and cereals of all kinds, including maize; also tobacco, hemp, succory, &c., from which a large revenue is raised annually; chestnuts, walnuts, almonds, apples, pears, and other fruits, grow in abundance; about 16,500,000 gallons of wine are produced yearly. Of minerals, there are silver, lead, iron, gold, and several kinds of precious stones. B. is also rich in mineral springs, and there are consequently numerous favourite watering-places, such as Baden-Baden, Badenweiler, Rippoldsau, Ueberlingen, Griesbach. The principal manufactures are cotton fabrics, trinkets, tobacco, chicory, paper, leather, beer, and articles of straw. The chief exports are wine and timber; the imports are colonial goods, horses, wool, cotton, silks, iron, &c.

In 1871 the pop., two-thirds of which are engaged in agricultural pursuits, numbered 1,461,562; of which 64.6 per cent. were Roman Catholics, 33.53 per cent. Protestants, 1.76 per cent. Jews, and the rest Dissidents and Mennonites, or Baptists. The estimated expenditure for 1875 was £1,510,046, and revenue £1,494,824. The general debt in 1874 amounted to £2,468,962; the railway debt to £12,465,665. The government of B. is a monarchy, constitutional and hereditary, based upon the charter of August 22, 1818. Two chambers compose the Parliament, which meets every two years, the first chamber consisting of representatives of the nobility, of the landed interest, of the Church, and of the universities; the second of 22 deputies for certain towns, and of 41 for the country districts. The army, which is under the control of the state, amounts in peace (1875) to 14,228 men, in war to 25,843.

The Alemanni, the original inhabitants of B., were conquered by the Franks; and owing to their repeated endeavours, especially under their 'Duke' Gottfried, from whom the present rulers of B. claim descent, to regain their freedom, Pippin the Little abolished the dukedom in 748. Still the family did not become extinct, and in an obscure way struggled to maintain a kind of hold on the land in that region. We read of Gerolds and Gebhards, who dimly figure as counts there. At last, in the 11th c., one of these, Berthold, favoured by the Emperor Heinrich III., established himself as a 'Duke,' and from him, at any rate, through his second son, Hermann, we have an unbroken series of princes of the Badenese house of Zähringen; but the family vicissitudes were numerous, and every now and again the main line died out, and recourse was had for princes to subordinate branches. The Markgraf Christoph (died 1527) united all the Badenese lands; but divided them anew among his three sons. The family of one of these soon became extinct; the other two founded the houses of Baden-Baden and Baden-Durlach; but in 1771 the former died out, and the family possessions were again reunited. Karl Friedrich, who began to rule in 1746, greatly increased by his policy the influence and importance of B. His reign is one of the longest on record—65 years. Karl favoured the policy of Napoleon, and was raised to the dignity of Grand-Duke when he joined the Confederation of the Rhine. His grandson, Karl Ludwig Friedrich, went a step further, and married (1806) Stephanie Louise Adrienne Napoléone, an adopted daughter of the French Emperor, but after the battle of Leipzig abandoned the Confederation of the Rhine, and in 1815 joined the national *Bund*.

From 1815 to 1848 the history of B., like that of most other German states, is the history of parliamentary struggles to secure a liberal administration, to which, as a rule, the sovereigns and their advisers were obstinately opposed. But in 1846, it became necessary to call the Liberal party into power to quell the agitation in the country, and a number of wise and conciliatory reforms were passed. The outbreak of the French revolution, however, in 1848, stirred up discontent anew. The left wing of the Liberal party became clamorous for a republic, the troops fraternised with the insurgent democracy, and the Grand-Duke fled (May 1849). But Prussia was resolved that Germany should not dissolve into political chaos. By her help the Grand-Duke recovered his dominions in a couple of months, and although numerous executions took place, many important reforms were introduced, and B. gradually abandoned both reactionary and radical politics, and settled down into a mode-

rate Liberalism, which ecclesiastical conflicts have disturbed, but not destroyed. In 1870 B. took an active part in the Franco-Prussian war, and became a member of the German Empire, November 15, 1871. See Bader, *Badenia, oder das bad. Land und Volk* (new ed. 1858-62, 2 vols.); Hennisch, *Das Grossherzogthum B.* (1857); Pflüger, *Bad. Vaterlandskunde* (1866); and Friedberg, *Der Staat und die Kathol. Kirche in B.* (1871).

Ba'den, a Swiss town, canton of Aargau, with warm baths (the *Therma Helvetica* of the Romans), and the seat of the Swiss Diet till 1712. Pop. (1870) 3412.

Ba'den-Ba'den, a town in a valley of the Schwarzwald, Grand Duchy of Baden, celebrated for its hot springs, the salubrity of its atmosphere, and the picturesque beauty of the surrounding scenery; hence from May to October it is crowded with visitors in search of health. Its famous, or rather infamous, gaming-tables were closed in 1872, with the other licensed gambling-houses of Germany. In 1860 there were as many as 46,842 visitors to B., but the number has since declined. Pop. (1873) 10,080.

Ba'den bei Wien, the *Therma Cælia* or *Pannonia* of the Romans, an Austrian watering-place, 15 miles S. of Vienna by rail, which has sometimes over 15,000 visitors. The baths, from being used by both sexes in common, are called 'society-baths.' Pop. (1869) 7590.

Badenoch (the derivation of the word is uncertain), a district in the S.E. of Inverness-shire, traversed by the Spey, is chiefly notable as having been for a time held by the house of Comyn, on whose forfeiture it was bestowed by Bruce on his nephew Randolph. In 1371 it was given by King Robert II. to his son, known as 'the Wolf of B.,' reverted on the failure of his descendants to the crown, and in 1456 was granted to the Earl of Huntly. The greater part of it is covered with forests.

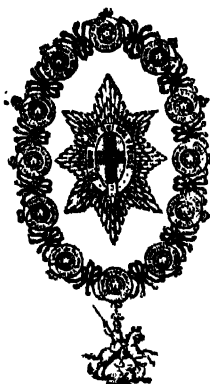
Badge. Emblems denoting titles and dignities in general are called badges; and in certain orders the word is used especially to denote the pendant which forms part of their insignia. In all the affairs of life, mankind love the emblems of rank and pomp; the quality and quantity of them frequently forming the subject of serious dispute, even of bitter conflict, political or ecclesiastical; a fact which might almost lead us to acquiesce in the satire conveyed in Swift's account of the *Pig* and *Little Endian* warfare of Lilliput. Recently, the throne of France was declined on account of a B. While it is often difficult to see, or even to conjecture, what is the virtue, prowess, or legend of which badges are meant to be emblematic, the subject is nevertheless generally interesting, and not without special value to the archaeologist. The following are a few of the most famous badges:—

France—The *fleur-de-lis* and the imperial eagles.

England—The red rose and the white rose, with crown.

Scotland—The thistle with crown.

Ireland—The harp and crown, and the shamrock and crown.



Order of the Garter—
Insignia.

Order of the Garter.—A dark-blue ribbon edged with gold, bearing the motto *Honi soit qui mal y pense* in golden letters, with buckle and B. of gold. The collar is of gold. The George—which is the figure of St George and the Dragon—is worn to the collar. The star is silver, with the cross of St George in the centre, encircled with the garter. See GARTER, ORDER OF THE.

Order of the Thistle.—A star, with the motto *Nemo me impune lacessit*; also collar and B., with the cross and figure of St Andrew. See THISTLE, ORDER OF THE.

Order of St Patrick.—A collar of gold, with a crown in the centre, within which a band of blue enamel, with the motto *Quis separabit*, MDCCCLXXXIII. Attached to the crown is a harp of gold, from which hangs a golden B. or jewel.

See PATRICK, ST, ORDER OF.

Badger (*Mela*), a genus of Carnivorous mammalia, forming the type of the family *Melidae*, the members of which are *plantigrade*—that is, apply the whole sole of the foot to the ground in walking. The body in the badgers is elongated. The legs are shortened. The carnassial tooth—the last tooth but one in the upper, and the last tooth in the lower jaw—of the badgers has only a part of its edge sharp and cutting, and it is only partly tuberculate, or provided on its surface with small points or tubercles. The common B. (*Mela taxus*) inhabits Britain, Europe, and Central Asia. It averages 2½ feet in length, and in height measures from 10 to 12 inches. It is coloured greyish-brown on the upper, and black on the under parts. The head is white, and marked on the cheeks by a longitudinal black band. The fur is of coarse texture. It is nocturnal in habits, and appears to be of inoffensive disposition, although when attacked—as by dogs, in the sport formerly pursued and known as 'badger-baiting'—it can bite very severely, and defend itself with pertinacity and courage. It feeds chiefly on roots, but also eats fruits, and all kinds of animal substances. It burrows in the ground, and lives within the excavation. The flesh, though coarse, is eaten, especially in China. If taken young, the B. may be domesticated. The 'Siffleur' (*Mela Labradoricus*), or American B., occurs in Canada and the United States. It is an expert burrower, and hunts the smaller mammalia. It is of a grey colour in winter, and yellowish-brown in summer. The Indian B., or *Balsaur* (*Mela collaris*), inhabits the mountainous districts of Hindostan. This latter species much resembles the common B. in size, but it possesses a muzzle-like snout, and the tail is small and destitute of long hairs. A Japanese species (*M. amakinnu*), Temminck, has also been described.



Badger.

The honey-badgers, or rats (*Mellivora*), found in Southern and Eastern Africa, &c., are so named from their partiality for honey. They resemble the common B. in appearance, but present certain structural differences from that form. The *Mellivora Capensis* of the Cape and the Indian ratel (*M. Indica*) are familiar species.

Badi'a-y-Leblieh, Domingo, an African and Asiatic traveller, born at Barcelona, 1st April 1767. Being early smitten with the love of travel and adventure, he departed for Africa in 1803 disguised as a Mussulman, having previously acquired a competent knowledge of Arabic, and of the manners and habits of those he meant to visit; and to give colour to his pretence of being descended from the Abbasides, assumed the name of Ali-Bei-el-Abbassi. The Emperor of Morocco invited him to his court, whence he set out in 1805 for Mecca, which he reached in 1807. After travelling for a short time in Palestine, he reached Constantinople, where the genuineness of his faith was suspected, and he retired to Spain. Here his patriotism yielded to his interests, and he submitted to the sway of the French on their conquest of Spain. After the English had expelled the invaders from the Peninsula, B. retired to Paris, where in 1814 he published a narrative of his travels:—*Voyages à Ali-Bei en Afrique et en Asie pendant les Années 1803 à 1807*. During a second journey in the East, of which no record has been preserved, he died suddenly, August 30, 1818, at Aleppo.

Bael or **Bhel Fruit**, the fruit of *Aegle marmelos*, a plant closely allied to the orange. The fruit, which possesses a very delicate taste and a fine odour, is the original source of marmalade. The rind of the unripe fruit is stringent, and is an official remedy for diarrhoea and dysentery.

Baer, Karl Ernst Von, a Russian naturalist, born in Esthonia, 17th February 1792. After studying medicine at Dorpat from 1810 to 1814, he proceeded in the latter year to Germany to complete his scientific education; thence to Königsberg in 1817, where, besides exercising the functions of professor of zoology, he organised the zoological museum. In 1834 he was called to St Petersburg, and in 1837 he was sent by the Czar on an arctic expedition. On his return he published an interesting account of the fauna and flora of the northern coasts of Russia. In 1858 he was elected a corresponding member of the French Academy

of Sciences. In addition to valuable researches in embryology embodied in his *De Ovi Mammalium et Hominis Genesi* (Leips. 1827), B. has published *A History of the Development of Animals* (Königs. 1828-37), and *Studies on the Russian Empire and the Neighbouring Countries of Asia* (St Petersburg. 1856). During 1851-56 he devoted his attention to the Russian fisheries in the Baltic, the Caspian, and Lake Peipus, and the results of his investigations are contained in 4 vols. (St Petersburg. 1857-59). Numerous valuable papers of B.'s are contained in Helmersen's *Beiträge zur Kunde des Russischen Reichs* (vol. i.-xxii., St Petersburg. 1839-61). He died at Dorpat, 28th Nov. 1876.

Bae'na, a town of Spain, province of Cordova, on the river Marbella, 24 miles S.S.E. of the city of Cordova, has considerable trade in oil and grain. It is built on the site of a Roman town, many remains of which have been discovered. The climate, water, and fruits of the district are delicious. Pop. 11,600.

Bae'za (anc. *Bratia*, or *Biatia*), an old town in the province of Jaen, Spain, near the Guadalquivir, 22 miles N.E. of the city of Jaen. It was the scene of the defeat of Hasdrubal (B.C. 209) by Scipio the Elder; became an important place under the Moors; but in 1239 was sacked by St Ferdinand, and has never flourished since. There are, however, some noble buildings of the 16th c., chief of which is the cathedral, modernised in 1587. The sculptor Gaspar Becerra was born here in 1520. It also claims to be the birthplace of 'the 11,000 virgins of Cologne.' Pop. 13,400.

Baff'a, a small seaport of Cyprus, on the S.W. coast of the island, occupies the site of the New Paphos, which was destroyed by an earthquake in the time of Augustus, but was soon rebuilt. To the S.E. stood Old Paphos, the chief seat of the worship of Venus, with innumerable splendid temples. It was believed to be the favourite residence of the goddess, and the point where she first landed when she rose from the sea. Under the Venetians B. was a flourishing place, but it is now a decayed town with an inconsiderable trade.

Baffin's Bay, so called from its discoverer, William Baffin, who in 1616 sailed along its eastern fringe, and believed it to be a bay. During the 17th and 18th c. the honesty of Baffin was disbelieved, and his discoveries expunged from the charts. In 1818 Sir John Ross sailed over the track of Baffin, and verified his discoveries. Arriving, however, at the extreme N. of B. B., Ross imagined he beheld the land closed in this direction by a line of mountains running E. and W. In the following year Sir Edward Parry sailed over these supposed mountains into Smith's Sound, thus proving that what is generally termed B. B. is really a great inland sea extending between the W. coasts of Greenland and the shores of the most easterly of the islands forming the Arctic Archipelago of N. America. Length about 600 miles, breadth about 300. It is open and navigable only for about two months in the year.

Bagaria, or **Bagheria**, a town of Sicily, 9 miles E. by S. from Palermo by rail, beautifully situated between the bays of Palermo and Termini, and a favourite resort of the Sicilian nobility. Pop. 12,950.

Bagasse, the refuse of sugar-canes after they have been passed through crushing-rollers and the saccharine juice extracted. It is used as fuel in the concentration of the juice by boiling, and the ash left after burning is returned to the soil as manure.

Bagatelle (*Fr.* a trifle), a game in some respects like billiards, but played on a small board or table, circular at one extremity, where a series of nine cups are arranged for receiving the balls. The game is usually played with nine balls,—four white, four red, and a black 'tee' ball. The methods of playing and the rules of the game vary considerably, but being chiefly a domestic or family amusement, players have much liberty to please themselves as to regulations.

Bagdad, the chief town of the vilayet of B., Asiatic Turkey, 220 miles S.E. of Aleppo. Originally built on the right bank of the Tigris, it is now intersected by the river, the two portions being connected by a bridge of boats, which is defended by a citadel on the left bank. A wall of brick and mud, 5 miles in circumference, encloses the town, the houses of

which are constructed of brick. B. has been built on no regular plan, and the narrow, tortuous, unpaved streets teem with impurities, which would greatly endanger the public health were they not speedily removed by the troops of hungry dogs, which swarm here, as in the other cities of the East. The meanness of the exterior of the houses is frequently compensated for by their gorgeous internal decorations. The public buildings are mainly the mosques, the caravanserais, and the bazaars. The mosques, 100 in number, are distinguished by massive and lofty minarets, but the bazaars yield in magnificence to those of many Eastern cities. The principal trade of B. is with Aleppo and Damascus; and its chief manufactures are of leather, and stuffs of silk and cotton. B., founded in 763 by the Calif Almansur (q. v.), and enlarged and beautified by his successor, Harun-al-Rashid, has been successively conquered by Seljukide Turks, Tartars, Persians, and Ottoman Turks, to whom it has been subject since 1638. Pop. (1873) 60,000. The vilayet of B. 550 miles by 350, area about 93,000 sq. miles, supposed pop. 2,000,000, comprehends Khuzistan, Kurdistan, Algesirah, Irak-Arabi, and a barren waste W. of the Euphrates; products, maize, rice, tobacco, dates, &c.; and is notorious for the lawlessness of its inhabitants.

Baggage. According to the marching regulations of the British army, a private soldier is allowed to carry nothing except what his knapsack can hold. Married men have a small extra allowance. See CARRIERS, LAW REGARDING.

Baggesen, Jens, a popular Danish poet, well known also in German literature, was born, February 15, 1764, at Korsör, in the island of Zealand. He went to the University of Copenhagen in 1782; and, while a student there, gained some reputation as a writer of songs, odes, and comic tales. B. published at Copenhagen, 1790, in Danish, *Holger Danske*, an opera; in 1803, at Hamburg, a collection of poems in German; in 1806, also in German, *Parthenis oder Alpenreise*, an idyllic epic written in hexameters, which was very successful. In 1811 he was appointed professor of the Danish language and literature at Kiel; but never fairly settling down to the work of this chair, he went to Copenhagen in 1814, where he received a pension of 1500 dollars (£165) a year. Here he criticised with unseemly severity the works of Oehlenschläger, a younger dramatist, whose brilliancy and popularity had put B. considerably in the shade. This created a literary quarrel between the two poets and their partisans, which lasted till 1820, when B. finally left his native country. His Danish dramas have little merit; but the lyrics and comic epics are highly esteemed by his countrymen. He shone at his brightest in the serio-comic treatment of a theme. In *Der Vollendete Faust*, left by him in MS., he satirises the scientific and political follies of his time; and in *Adam und Eva, oder die Geschichte des Sündenfalls*, published shortly after his death, he treats a very grave subject rather gaily. He died at Hamburg, October 3, 1826. His lasting monument in literature is an edition of his *Poetische Werke in Deutscher Sprache* (Leips. 5 vols. 1836), edited by his son, who contributes a biography. His Danish writings in 12 vols. were published at Copenhagen (1827-32, new ed. 1845-48). His correspondence with Reinhold and Jacobi appeared at Leipzig in 1832, and some posthumous fragments edited by his son August at Copenhagen in 1855.

Baglivi, Giorgio, an Italian physician, born at Ragusa, September 1669; studied at Padua and Bologna; removed to Rome in 1692, and was there made professor of anatomy by Clement XI. He advanced medical science by discarding humoral pathology, which made the fluids of the body the original source of disease, for 'solidism,' which maintains that the solids are first affected, and the fluids only secondarily—a doctrine which has since his time gradually gained ground, Hoffmann and Cul'en having further elaborated it. B. died at Rome in 1706. There have been several reprints of his complete works, *Opera Omnia Medico-Practica*, since their first publication at Leyden in 1704.

Bagna-Cavallo ('the horse's bath'), a town of Italy, province of Ravenna, 12 miles W. from Ravenna by rail, has a cathedral dedicated to Michael the Archangel, and was the birthplace (1484) of Bartolomeo Ramenghi (better known as Bagnacavallo), a famous artist. Pop. 4000.

Bagna'ra (Lat. *Portus Orestis*), a seaport in the province of Reggio (Calabria), S. Italy, situated near the extremity of the peninsula, in a rich wine country. Pop. 8517.

Bagnères, the name of two well-known watering-places in the S. of France.—1. **B. de Bigorre** (Lat. *Aqua Bigorriensis* and *Aquensis Picus*), in the department of Upper Pyrenees, at the mouth of the fine valley of the Campan, overhung by Mont-alivet, has over 40 saline springs from 20° to 60° R., which attract about 20,000 visitors yearly. B., known as the French *metropole des eaux thermales*, has also some manufactures of woollens, linens, and barèges. Pop. (1872) 7239.—2. **B. de Luchon** (Lat. *Aqua Convenarum*), in the department of Upper Garonne, at the junction of the rivers Pique and One, near the entrance to the *Val d'Aran*. It has 54 sulphurous springs, from 16° to 58° R., and is one of the most picturesque and flourishing bathing-places in France. Pop. (1872) 3750.

Bagnes, the name given to the convict prisons of France. In former times, labour at the galleys was the severest punishment short of death inflicted on criminals. The Galley (q. v.) was worked by the convicts, or galley-slaves, chained to the oars. This system was abolished in 1748, and labour in the B. put in place of it. In these establishments, in later times at least, the plan and discipline appear to have been good. Under the *Code Napoleon*, convicts were employed in work profitable to the state, and various handicrafts were taught under the superintendence of skilled teachers. Good behaviour was rewarded with relaxation, and the industrious were allowed to retain a portion of their earnings. In 1852 the B. were suppressed by the imperial government, and transportation to Guiana put in place of them, the choice being left to those in prison at the time to remain or be transported.

Bagnes-le-Chable, a village on the left bank of the Dranse, canton of Valais, Switzerland. It has suffered much from inundations. Pop. of the village, 4254; of the parish, 9000.

Bagno (plur. *bagni*), the Italian form of 'bath,' entering into the name of numerous places in Italy noted for their saline or other springs. Among these may be mentioned :—1. **Bagno di Lucca**, a village in the province of Lucca, and a favourite resort on account of its hot springs and the amenity of its neighbourhood. Its prosperity depends much on its foreign visitors, who constitute a great part of its population. Gambling, formerly a favourite pursuit here, was suppressed in 1846. Pop. of commune (1861) 8238.—2. **Bagno a Ripoli**, a fashionable bathing-place in the province of Florence, a few miles E.N.E. from Florence. Pop. 14,385.—3. **Bagno in Romagno**, 35 miles E. by N. from Florence, with hot springs and an old church. Pop. 7165. The surrounding country is fertile, and the mass of the forests on the neighbouring mountains supports numerous swine.—4. **Bagno di S. Giuliano**, near Pisa, much frequented in early times by the Romans. Pop. 16,777.

Bagno10, the name of a town of Piedmont, province Cuneo, 12 miles N.W. from Saluzzo; also of a small town near Brescia; and of another in the province of Lucca, in S. Italy, besides of many small Italian villages.

Bagpipe, one of the oldest musical instruments, which seems to have been used at some time in its history by almost every nation. As now used in Scotland, it consists of a leathern bag inflated from the performer's lungs, and the wind by the pressure of his arm is expelled through several pipes. One of these is called the *chanter*, and is provided with a reed and with eight finger-holes for playing upon; the others are called *drones*, and sound continuously the same note. The effect of its music depends more upon the nationality of the listener than upon its intrinsic qualities. Although rude and harsh in the extreme, there are few Highlanders who do not feel it exciting and inspiring.

Bagration, Peter, Prince, born in 1765, entered the Russian service as sergeant in 1782. He distinguished himself in Suwarrow's Caucasian, Turkish, and Polish campaigns, being made colonel on the critical field of Oczakow (17th December 1788). He also followed Suwarrow in the Italian campaign of 1799, taking Brescia (10th April 1799), and contributing to the decisive defeat of the French at Novi. Falling into disgrace with Paul I., he was restored to command by Alexander, and rendered important service during the retreat of Kutusow before Murat, which was shortly followed by the battle of Austerlitz (1805). As lieutenant-general under Bennigsen, B. fought at

Preuss-Eylan and Friedland in the war of 1807. The following year, in accordance with the provisions of the Treaty of Tilsit, he occupied Friedland, defeating Doebeln and Lowenheim, and in 1809 commanded the Moldavian army against the Turks at Silistria. After a brilliant retreat before Davout upon Smolensk in the Russian campaign of 1812 (in the course of which, however, he was defeated at Mohilev on the Dnieper), B. was mortally wounded on the retreat to Moscow after the battle of Borodino, and died October 7, 1812. His grandson, **Prince Peter Romanovitch B.**, is a major-general in the Russian service, and since 1862 has been governor of Tver. He recently discovered in the mines near Slatoust an unknown fossil species, which has been named after him *Bagrationit*.

Bagshot Beds, so called because first examined on Bagshot Heath, Surrey, belong to the strata of the Middle Eocene, and are met with in a full state of development in the Isle of Wight. The upper division consists of thick sands, generally poor in fossils; the middle division comprehends the Barton and Bracklesham beds, consisting of clays and sand, and rich in fossil remains, such as Nummulites, with reptiles, fishes, and mollusca,—which also occur in the *Calcaire grossier* of Paris. The lower division consists of various coloured sands and pipe-clays, and forms the basis of the Middle Eocene formations. The maximum thickness of the B. B. is about 1200 ft.

Bagul, or **Baghul**, a native state in the N. W. of India, dependent on the Punjab government. It pays an annual tribute of £360, and maintains a force of 222 men, having a revenue of about £6000. The country is mostly mountainous. Area, 150 sq. miles; pop. (1872) 22,000.

Bahamas, a chain of British W. Indian islands, extending from about 50 miles off the N. American peninsula of Florida in a S.E. direction to within about 100 miles of the N. coast of Hayti—a distance of 700 miles. The average width of the chain is over 100 miles. The basis of the islands is coralline, and they have the usual configuration of the reef—long, narrow, and low. About twenty of the B. are inhabited, and of these the chief are New Providence, with the capital and seat of government, Nassau, Eleuthera, Harbour Island, Exuma, St Salvador, Andros, Great Bahama, Crooked Island, and Rum Cay. The islets (called keys) are very numerous, and the coral rocks of the chain are countless. Area, 3021 sq. miles; pop. (1871) 39,162. The soil is not deep, but—the porous rocks forming magazines of moisture—is very fertile. Chief productions, coffee, sugar, indigo, Brazil wood, cotton—since the American civil war—guinea-corn, maize, pineapples, lemons, oranges. Climate ranging from 73° to 93° F. in summer, but in winter delightfully temperate—the islands being much resorted to in this season for pulmonary diseases. The B. were the first American discovery of Columbus, who landed on what is now called Watling's Island (October 12, 1492): the native Carib population disappeared before the Spaniards, who did not colonise the island. In 1629 they were acquired by the English. See A. Trollope's *Travelling Sketches* (1866); Baco's *Bahamas* (1869); and Kingsley's *At Last: A Christmas in the W. Indies* (1871).

Bahar, or **Behar**, the chief town of an old Mohammedan province of the same name, situated in the British commissioner-ship of Patna, near a branch of the Ganges, 34 miles S.E. of the town of Patna, and 159 W. of Benares. It was sacked by the Mahrattas about 1742, and was afterwards in great part depopulated by a famine, but of late years it has gradually recovered, and is now a place of some importance. Pop. (1872) 44,295. The old province of B. was formerly part of the empire of Delhi. Area, 42,417 sq. miles; pop. (1872) 19,736,101. In 1765 it passed under English rule, and was portioned into the two divisions of Patna and Bhagulpore, and again into ten executive districts. This entire region, lying in the valley of the Ganges, is fertile and populous, but is subject to inundations, and has bad roads. The British district of B., named officially Gya, has an area of 4718 sq. miles, and a pop. (1872) of 1,949,750.

Bahia, or **San Salvador**, the capital of a province of the same name, Brazil, on a promontory forming the northern side of All-Saints' Bay. Next to Rio de Janeiro it is the largest seaport of the empire, and has a splendid harbour and strong fortifications. It was founded in 1549, and is the oldest town in Brazil, of which it was capital till 1763. In 1874, by the con-

tinuation of the cable from Pernambuco, B. was placed in telegraphic communication with Europe. The trade of the port has recently declined very much. In the financial year 1872-73 the value of the imports was £2,367,003; of exports, £1,871,212. The exports are chiefly sugar, tobacco, coffee, cotton, rum, Brazil wood, diamonds, and piassava; imports, manufactured goods, drugs, wines, flour, coals, and hardware. Pop. (according to the official report of 1874) 152,000.

Bahia, a maritime province in the S.E. of Brazil, is intersected by lofty sierras, and watered by the great river San Francisco. It is covered with forests of valuable timber, and is rich in metals and precious stones, but the country is almost inaccessible for want of roads. A railway to the interior, however, is now almost completed. The diamond-mining of B. was nearly ruined by the discovery of the fields at the Cape of Good Hope, but in 1874 large deposits of amethysts were found near the town of Caetite, and the extensive digging operations begun are yielding promising returns. B. exports more sugar now than all the rest of Brazil taken together, and the cultivation of coffee is rapidly increasing. Area, 127,911 sq. miles; pop. (official return 1873) 1,450,000, of whom 280,000 are slaves.

Bahia-Honda (Port. 'deep bay'), a seaport of Cuba, on the N. coast of the island, 60 miles W.S.W. of Havana, formerly much resorted to by privateers. Pop. 4000.

Bahna'sa, or **Behne'seh** (anc. *Oxyrynchus*), a small town in Central Egypt, on the *Bar Yusuf* ('Joseph's Canal'), containing some interesting ruins of the old Greek city. In Christian times, *Oxyrynchus* became the seat of a bishop, and numerous monasteries once existed here, of which the ruins are still visible.

Bahr, an Arabic word, signifies a large body of water, and is applied to both rivers and lakes. For instance, the two chief branches of the Nile are called *Bahr-el-Abiad* ('the white river'), and *Bahr-el-Azrak* ('the blue river'), while *Bahr-Assal* means Lake Assal, or 'salt lake.'

Bähr, Johann Christian Felix, a German philologist and antiquarian, was born at Darmstadt, June 13, 1798; educated at Heidelberg; appointed (1826) ordinary professor of philology in the same university; and died November 27, 1872. His principal writings are an annotated edition of *Plutarch's Alciades* (Heid. 1822); *Philopomen, Flaminius, and Pyrrhus* (Leips. 1826); the fragments of *Ctesias*, with careful elucidations; and above all, a *Geschichte der Röm. Literatur* (Karls. 1828, 4th ed. 1869). To this clear and comprehensive history three supplements were added—*Die Christl. Dichter und Geschichtsschreiber Roms* (1836); *Die Christl.-Röm. Theologie* (1837); and *Geschichte der Röm. Literatur im Karolingischen Zeitalter* (1840). Another very valuable work was his version of *Herodotus* (1832-35, 2d ed. 1855-61). In 1835 he published his *De Universitate Constantinopoli Quinto Sæculo Condita*. He was a frequent contributor to Jahn's *Fahrbücher für Philologie*.

Bahrdt, Karl Friedrich, a German theologian, born August 25, 1741, at Bischofswerda, Saxony. He studied at Leipzig, and was a professor successively at Leipsic, Erfurt, and Giessen, but became unpopular from his heterodox preaching, and undertook in 1755 the direction of a Philanthropin in the Grison country. He then went as general superintendent to Dürkheim, Leiningen-Dachsburg; established another Philanthropin at Heidesheim in 1777; but being declared by the Aulic Council, on account of the gross frivolity displayed in his translation of the New Testament, incapable of holding any ecclesiastical office, he withdrew in 1779 to Halle, where he suffered two years' imprisonment for his writings entitled *Das Religionsedikt* and *Die Deutsche Union*, and where he died, 23d April 1792. In addition to his theological works, which are all of a deistical tendency, B. wrote *Geschichte seines Lebens, seiner Meinungen und seiner Schicksale* (4 vols. 1790). See *Leyser, K. F. B.* (1867).

Bahrain Islands, or **Avail Islands**, a group of islands belonging to Muscat, and lying in the Persian Gulf, with a pop. of about 40,000. The inhabitants are chiefly engaged in the pearl-fisheries, which are estimated to yield nearly £300,000 annually. The largest of the islands is 27 miles long and 10 broad. It gives its name to the group, and its capital is *Mena*, a centre of considerable trade, with a pop. of 3500.

Baiæ, anciently a town on the coast of Campania, famous for its warm springs, became towards the close of the republic a favourite resort of the wealthy Romans, who, with insolent ostentation of wealth, sometimes built their villas out into the sea. Julius Caesar, Pompey, and other distinguished citizens, had country seats here; and it was a chosen retreat of the Emperors Nero, Caligula, Hadrian, and Alexander Severus. Horace preferred B. to every spot of earth besides. As the resort of the idle and the wealthy, it soon acquired the fame of being a hotbed of the vices. Some ruins of temples, baths, and villas still mark the site of B. The name is preserved in the modern *Castello di Baja*, built in the reign of Charles V.

Baikal (Turk. *Beikul*, 'rich lake'; Mongol. *Dalai Nor*, 'holy lake'), the largest fresh-water lake in Asia, lies in the Russo-Siberian government of Irkutsk, and sweeps S. and S.W. in the form of a sickle, from 103° to 110° E. long. Length, 400 miles; area (estimated), 14,000 sq. miles. It is surrounded by the Baikal Mountains, is fed by the Selenga, 700 miles in length, and many other streams, and has an outlet in the Lower Angara to the Yenesei river, which, however, carries off only a tenth of the volume of water received from affluents. It is the deepest lake known—3766 metres. Fisheries, especially of sturgeon and seal, are important. There are two ports; steamers ply in summer; and from November to April, when the lake is frozen over, traffic is carried on over the ice.

Bail is a term of English and Scotch law; but in England it applies both to criminal and civil procedure, in Scotland only to the former. In England, the justice before whom a prisoner is brought must after examination either discharge him, commit him, or require him to give B.; by which is meant, that he must find sufficient sureties for his appearance in court at a specified time. The accused is meanwhile at liberty. In former times all felonies were bailable, but many are now excepted by statute. No justice of peace can take B. on a charge of treason, murder, arson, or manslaughter, unless the case against the accused be a very flimsy one. The Court of Queen's Bench may B. for any crime; but the accused cannot demand that it should do so as his right. Two sureties are required to B. for felony, and the amount of B. will depend on the circumstances of the accused and on the nature of the offence. In a civil process, one surety is legally sufficient; but the sheriff may require two, or, under certain circumstances, even more; and by accepting one he may incur personal liability.

In Scotland, the law as regards B. in criminal cases is essentially the same as in England; at least it is so practically. The Court of Justiciary may take B. even in capital cases; but it would certainly be only in very extraordinary circumstances that this would be done. The Lord Advocate may do so also, and may fix the B. at any sum he pleases. The analogous term to B. in a civil process in Scotland is caution. See CAUTIONARY, CAUTION.

Bail Court, the name of a court at Westminster which may be held by any one of the puisne judges of one of the courts of Common Law when his court is sitting. The judge sits apart, and hears and decides on questions of special bail, administering oaths, &c. Hitherto this court, constituted under William III., has only been used as an adjunct by the Court of Queen's Bench.

Bailees. See BAILMENT.

Bailey, Philip James, an English poet, born at Basford, Notts, in 1816, attended two years at Glasgow University, began to study law in 1833, became a member of Lincoln's Inn in 1835, and was called to the bar in 1840. His most remarkable poem, *Festus*, was begun in 1836, and published in 1839. In 1877 it had reached its tenth edition in this country, and in America it has been even more admired and read than in England. With this poem *The Angel World* was incorporated in 1850. Later works by B. are *The Mystic*, 1855; *The Age*, 1858; and *The Universal Hymn*, 1867. B. has outlived the fame of thirty years ago. *Festus* took the popular ear by its boldness and its philosophic pretension; but much of its boldness is unbridled extravagance, and much of its 'thinking' is aimless vagary and puerile speculation. Still the work has its memorabilia. Its imagery is often strangely original, and unmistakably marks a new mind, which, unhappily, never ripened into fullness of life. The lyrical scenes are frequently fine, and contain songs which the world will not willingly let die.

Bailey, Samuel, an eminent writer and thinker, particularly on metaphysics and political economy, was born in 1791 at Sheffield, where he followed the profession of a banker, and died January 18, 1870, leaving £90,000 to his native town. He wrote a number of books, essays, and pamphlets, those on the *Pursuit of Truth*, *Parliamentary Reform*, and *Joint-Stock Banks*, making a very considerable impression at the time they were published. The most important of his philosophical works are his three series of *Essays on the Philosophy of the Human Mind*, published in 1855, 1858, and 1863. B., who was a Lockian in philosophy and a Utilitarian in ethics, was an able thinker and a clear writer.

Baillie (Fr. *baillie*, Med. Lat. *ballium*, a corruption of the Class. Lat. *vallum*, a rampart), was the space enclosed within the outward walls of a castle, except the portion covered by the keep. The entrance was generally by a drawbridge over the ditch. The B. usually held accommodation for the soldiers, with a well, chapel, &c.

Bailie, a magistrate belonging to a municipal corporation in Scotland is so called. The office is analogous to that of an alderman in England. By common law, a B. is held to have the same power within his territory as the sheriff has in his county. He has also statutory powers. In a Scotch corporation, the chief magistrate or Provost (q. v.), and bailies, are *ex officio* in the commission of the peace. The *B. of the Abbey* is appointed by the Duke of Hamilton, as hereditary keeper of the Palace of Holyrood. He has jurisdiction in civil debts contracted within the sanctuary. B. formerly denoted a functionary required in Scotch conveyancing, but under the Titles to Land Act the office has become unnecessary.

Bailiff, according to its etymology (Med. Lat. *ballivus*, from the Class. Lat. *bayulus*, a burden-bearer), means an overseer acting for a superior. This word, which is the same as the Fr. *bailli*, Sc. *bailie*, Ital. *balio*, had an extensive application during the middle ages. In France, the royal *bailis* at one time exercised supreme military and civil jurisdiction in the districts allotted to them. Among the Knights of St John we find the word used to denote the eight members of their chapter. In England, under William the Conqueror, the superintendents of counties were called *ballives*.

Bailiff, is a legal officer in England under the sheriff, whose orders or decrees it is his business to execute; the sheriff himself being the Queen's B.; his county is called his bailiwick. *Bound bailiffs* are so called because the sheriff being to a considerable extent responsible for them, he binds them annually in a legal obligation, with sureties. The *special B.* is appointed by the sheriff on application of the plaintiff in a suit. There are also officers connected with royal castles, lordships of manors, &c., called bailiffs.

Bailiff, High, is an officer of the law in England who executes the duties of bailiffs in districts exempt from the ordinary supervision of the sheriff. The term is now generally applied to the superior classes of the bailiffs.

Bailiwick. See BAILIFF.

Bailleul, a town in the department of the Nord, France, with tanneries and manufactures of thread and lace. Its church of St Vaast is very ancient. The neighbourhood is celebrated for its cheese. Pop. (1872) 6348.

Baillie, Joanna, a poetess of the last and present centuries, who may be said to have prepared the way for the psychological poetry and fiction of the present day, for Browning on the one hand, and George Eliot on the other, was born in 1762, in the manse of Bothwell, Lanarkshire, her father, a Scotch Presbyterian minister, being descended from the celebrated family of B. of Jarviswoode. She removed to London at an early age, lived there a happy, peaceful, and retired life, dying at Hampstead, 23d February 1851, at the age of eighty-nine. In 1798, Miss B. published 'a series of plays, in which it is attempted to delineate the stronger passions of the mind, each passion being the subject of a tragedy and a comedy.' It is now generally admitted that the principle upon which the authoress proceeded was an erroneous one, as human beings are ruled not by one passion, but by a variety of often conflicting passions. But her plays are interesting as careful psychological studies. A second volume was published in 1802; and, indeed, she continued at

intervals to publish such volumes till 1836. The most powerful and popular of her dramas is *De Montfort*, which was brought upon the stage by Kemble. When an attempt was made to revive it in 1821, however, Kean said it was a fine poem, but not fitted to be an acting play. Besides dramas, Miss B. published a volume of miscellaneous poetry, including songs, in 1841. A new edition of her *Dramatic and Poetical Works* appeared in 1851, and *Fugitive Verses* in 1860. Her pieces are characterised by softness of diction, unaccompanied by maudlin sentimentality; and she is at her best when she is quietly playful, as in *The Kitten*. She was much esteemed by her literary contemporaries, particularly by Sir Walter Scott; and it was to her that, as we learn from the late Archdeacon Sinclair's *Old Times and Distant Places* (1875), that the author of the *Lay of the Last Minstrel* communicated the somewhat curious fact, that although he had written a description of Melrose Abbey by moonlight, he had not himself seen it under such circumstances.

Baillie, Matthew, M.D., brother of Joanna B., and one of the most eminent physicians and anatomists of his time, was born in the manse of Shotts, Lanarkshire, 27th October 1761. His father, Dr James B., removed first to the pastorate of Bothwell parish, and then to the professorship of divinity in the University of Glasgow; his mother was the sister of the celebrated anatomists and physiologists, William and John Hunter. After the usual curriculum at Glasgow University, he passed to Balliol College, Oxford, as a Snell exhibitioner. There he took degrees in arts and physics. At the same time that he was attending Oxford, he commenced, in 1780, anatomical studies under his uncle Dr William Hunter, in London, being frequently employed by him as demonstrator in his theatre at Great Windmill Street. So successful was his career, that, on the death of his uncle in 1783, he was appointed his successor. In 1784 he began to lecture, and, from the clearness of his style and his power of rendering intelligible abstruse and technical points, he gained a very high reputation as an expounder of anatomical science. As a medical practitioner he became after a time highly popular, and from his quick perception of the seat of a disease, and of the proper remedy to apply to it, as well as from his kindly manner, he was in especial request as a consulting physician. So great was his practice, that in one year his fees amounted to £10,000. Appointments and honours fl. ed in upon him. In 1810 he was made physician to George III., and was offered a baronetcy, which, however, he declined. Incessant labour wore him out, and although he retired to his seat at Luntisbourne, in Gloucestershire, he died September 23, 1823, in the sixty-third year of his age. His will showed a personality of £83,000, much of which was directed by him to be given to medical institutions and public charities. Dr B. wrote many works, the most important of which, published in 1795, is *The Morbid Anatomy of some of the most Important Parts of the Human Body*. This book, containing a large amount of valuable information, and also the results of a number of experiments made by his uncle and himself, had a European fame, and marks an era in medical science, showing the value of induction as not only a scientific, but a professional process.

Baillie, Robert, one of the most learned, influential, and moderate of the Scotch Presbyterian clergymen of the 17th c., was born at Glasgow in 1599. On the father's side, he was connected with the Baillies of Lamington, on the mother's, with the Gibsons of Durie, both old and well-known Presbyterian families. Educated at the university of his native city, he, in 1622, received episcopal ordination from Archbishop Law (Episcopacy being then the established religion in Scotland), and was shortly afterwards presented to the parish church of Kilwinning. Although he had become not only an Episcopalian, but an advocate of the doctrine of passive obedience, the discussions of the stormy years between 1630 and 1636 on Arminianism, and the ecclesiastical regulations introduced into Scotland by Archbishop Laud, made him change his views, and he became a keen champion of the Presbyterian cause. In 1638 B. sat as a member of the General Assembly which met in Glasgow to protest against Episcopacy being thrust upon the people of Scotland, and in 1640 he was chosen one of the commissioners sent to London to press on charges against Laud on account of his tyrannical conduct. Although he had now become an earnest champion of the divine right of Presbytery, and even accompanied the army

which defended the national faith in the capacity of preacher to one of the regiments, he was known as one of the most temperate of the Scotch clergy, and especially showed that he was so when he went to London in 1643 as a delegate to the Westminster Assembly of Divines. B. was one of the commissioners sent by his Church in 1649 to ask Charles II., then in Holland, to accept the Covenant and crown of Scotland. In 1642 he was appointed joint professor of divinity in Glasgow University with Mr David Dickson, and, after the Restoration, became its Principal. He died, July 1662, at the age of sixty-three. Besides writing theological works and controversial pamphlets, he left behind him, in *Letters and Journals*, an account of his public life, which is preserved in the archives of the Church of Scotland, and contains valuable material for a history of the critical period in which he played a by no means inconsiderable and an uniformly prudent part. He was a man of great learning, wrote Latin with much elegance, and, it is said, understood thirteen languages.

Baillie, Robert, of Jerviswoode, a celebrated Scotch patriot of the reign of Charles II., was the son of George B., of St John's Kirk, Lanarkshire, a cadet of the Lamington family, who had become proprietor of the estate of Jerviswoode in the same county. He distinguished himself from an early period by his attachment to the cause of civil and religious liberty, and his resistance to the tyranny of the Duke of Lauderdale. In 1676, having rescued his brother-in-law, a Nonconforming minister of the name of Kirkton, from illegal capture by an informer in the employ of Archbishop Sharp, named Carstairs, he was prosecuted for this interference, and an antedated warrant was furnished to Carstairs signed by nine of the Scotch councillors of the time, of whom, by his own confession to Bishop Burnet, the Marquis of Atholl was one. B. was fined 6000 merks (£318), and, on refusing to pay, was sent to prison. Such was the indignation throughout Scotland at the time, however, that at the end of four months he was released, on the payment of half the fine to Carstairs. In 1683 he engaged in the promotion of a scheme of emigration to S. Carolina as a means of escape from the tyranny at home. The same year he entered into communication with Russell, Sydney, and the other leaders of the Puritan party in England, and having gone to London, was cognisant of, if not a party to, a proposal for an insurrection as a means of obtaining reform. When the Rye-house Plot was discovered, he was arrested, and sent down to Scotland. After a long imprisonment, which completely shattered his health, he was, in the end of 1684, brought to trial before the Court of Justiciary in Edinburgh on the charge of conspiring against the life of the king, and of being hostile to monarchical government. After extraordinary and insufficient evidence, he was condemned to death, and underwent sentence 24th December 1684. Throughout all his troubles, particularly his last, he comported himself with Roman dignity and fortitude. By his contemporaries, and, apparently, with justice, he was credited with high administrative abilities, which, unfortunately, he had but little opportunity of displaying.

Bailly, Jean Sylvain, first an artist, then astronomer, was born in Paris, September 15, 1736, and devoted himself to science until the Revolution broke out. In the earlier and innocent stages of the Revolution he was conspicuous alike by his loyalty to the king and his love of liberty. Chosen President of the National Assembly, June 17, 1789, and Mayor of Paris, July 15, he laboured with incredible energy and assiduity to keep the citizens from starvation and revolt. After the flight and recapture of the king his difficulties increased. Discords showed themselves in the Assembly and throughout the nation. Finally it became his duty to order the National Guard to fire on the insurgent rabble in the Champs-de-Mars. The 'Irreconcilables' never forgave him. In November 1791 he resigned his office, and withdrew to Nantes, but when the Revolution grew more furious and hysterical, he was arrested and guillotined amidst the imprecations of delirious fanatics, November 10, 1793. His principal works are, *Sur la Théorie des Satellites de Jupiter* (1766), *L'Histoire de l'Astronomie* (1775-87, 5 vols.), a really great work, full of teeming and ingenious speculation, and written in a charming style; *Lettres sur l'Origine des Sciences* (1777), besides two posthumous works, *Essai sur l'Origine des Fables et des Religions Anciennes* (1779), and *Mémoires d'un Témoin oculaire de la Revolution* (1804, 3 vols.). See Arago's *Biographie de B.* (Par. 1852).

Bailment, an English law term, denoting the delivery of goods on trust for a special purpose, with a contract, expressed or implied, that they are to be returned when the special purpose is fulfilled. See BORROWING.

Baily, Edward Hodges, a famous English sculptor, born 1788 at Bristol; repaired to London in 1807, and studied for two years under Flaxman; gained the silver medal of the Royal Academy in 1809, and the gold medal in 1811; produced during his long lifetime an immense number of busts, portrait statues for the metropolis and the provinces, and many exquisite fanciful groups. He died 22d May 1867. Of his statues, the best-known is that of Nelson in Trafalgar Square, London. The chief of his imaginative works, which are remarkable for their originality, as well as for their simplicity and sweetness, are his 'Eve at the Fountain,' 'Eve Listening to the Voice,' 'Girl Preparing for the Bath,' and 'The Graces Seated.'

Baily, Francis, a celebrated English astronomer, was born April 28, 1774, at Newburgh, Berkshire, and died August 30, 1844, at London. Retiring from business as a stockbroker in 1825 he devoted himself wholly to science, organising the Astronomical Society, revising the *Nautical Almanac*, publishing a star catalogue, besides writing a *Life of Flamsteed* (1835). See Sir J. Herschel's *Memoir* before the Astronomical Society in 1844.

Bain, Alexander, an acute, original, and singularly lucid philosopher, was born at Aberdeen in 1818, and entered Marischal College in 1836, where he graduated in 1840. From 1841 to 1844 he acted as deputy for the Professor of Moral Philosophy, and taught the Natural Philosophy Class during the session of 1844-45. For some time he was assistant secretary to the Metropolitan Sanitary Commissioners, and afterwards to the General Board of Health. From 1857 to 1862 he was Examiner in Logic and Moral Philosophy in the University of London. Between 1858 and 1870, he was seven times Examiner in Mental Philosophy at the India Civil Service Examinations. In 1860 he was appointed by the crown Professor of Logic in the University of Aberdeen. From 1864 to 1869 he again acted as Examiner in the University of London. Professor B. commenced his literary career in 1840 as a contributor to the *Westminster Review*. His first great work was *The Senses and the Intellect* (1855), which was followed in 1859 by *The Emotions and the Will* (3d ed. 1875), completing a systematic exposition of mental phenomena. Like Hartley, he bases his psychology on physiology, but his analysis is much more accurate, subtle, and exhaustive. Later publications are, *A Manual of English Composition and Rhetoric* (1866); *Logic, Deductive and Inductive* (1870); *A Higher English Grammar* (1872); and *A Companion to the Higher English Grammar* (1874).

Baini, Giuseppe, an Italian musician and author, born at Rome in 1775. He early applied himself to musical art, and became director of the pontifical chapel in 1814. His great composition was a *Miserere*, written for the Sistine Chapel by order of Pius VII. Among his works, the *Essai sur l'Identité du Rythme Poétique et Musical* (Flor. 1820) is curious and interesting, while his *Memorie Storico-Critiche della Vita e delle Opere di G. P. da Palestrina* (2 vols. Rome, 1828) is one of the best works of its kind. B. died 10th May 1844.

Bairaktar or **Bairak-dar** (standard-bearer), the title of the grand vizier Mustapha, who was born in 1755. His valour as a soldier was early conspicuous, and in 1806, being then Pasha of Rustchuk, he opposed the Russians who had taken Bucharest. In 1807 the janizaries having revolted and deposed Selim III., B. made peace with the enemy, and marched on Constantinople. There he found that Selim had been strangled by order of Mustapha IV., who had seized upon the throne. B., deposing Mustapha (July 28, 1808), made Mahmoud II. sultan, himself becoming grand vizier. He now attempted to disband the janizaries, but they rose in arms, attacked the Seraglio (15th November 1808), and called on B. to restore Mustapha. B. defended himself valiantly till the palace was in flames, when he ordered Mustapha to be strangled, and his head thrown to the besiegers. He was found in an underground apartment, with his favourite slave and a faithful eunuch, all suffocated.

Bairam. See BEIRAM.

Baird, Sir David, a British general, born 6th December 1757, at Newbyth, Scotland. He joined the army in 1772; in 1779 he accompanied his regiment to India, and on the 10th of September in the following year he was captured by Hyder Ali at Perambucum, and detained as a prisoner for nearly four years in the fortress of Seringapatam. His most memorable military achievement was the capture of this fortress, 4th May 1799. At his own request he was intrusted with the command of the storming party, and his gallantry and humanity were equally admirable. For his distinguished services on this occasion he was presented with the state-sword of Tippoo Saib by the commander-in-chief, General Harris, in the name of the army. After eminent services in Egypt and India, he returned to Europe in 1803, and was knighted in June of the following year. B. was sent to Spain in 1808 with 10,000 men to assist Sir John Moore, and did distinguished service at Corunna, January 16, 1809, for which he received the thanks of Parliament for the fourth time in his life. He then retired from active service. In 1814 he was raised to the rank of a general, became governor of Kinsale in Ireland in 1819, and of Fort-George in 1827, and died at his seat of Fern-tower in Perthshire, August 18, 1829.

Baird, a Scottish family that has acquired extraordinary wealth during the present century. The father, Alexander B. of Lockwood, Old Monkland, began the celebrated mineral enterprises of the family in 1809: a lease of Gartsherrie was taken in 1826, and the first furnace was put in blast in 1830. Coal and iron were near each other, the new railway system passed conveniently through the field, and skill, talent, and energy did the rest. The works now include Eglinton, Blair, Portland, Lugar, and Muirkirk. The father died in 1833, leaving two daughters and eight sons, William of Elie, Douglas of Closeburn, George of Strichen and Stichel, David and Alexander of Urie, James of Cambusdoon, Robert of Auchmedden, and John of Lockwood. James of Auchmedden and Cambusdoon was born in 1803, sat as M.P. for Falkirk from 1851 to 1857, and died at Cambusdoon, Ayr, 20th June 1876. He was the munificent founder of the *B. Trust*. Fresh force and energy were imported into the vast business of the Bairds by a nephew, Alexander Whitelaw of Gartsherrie, who was elected M.P. for Glasgow in 1874 in the Conservative interest, but died in 1879. The B. family have become extensive landowners, the total rental of their estates reaching £81,000 a year.

Baird Trust.—James B. of Auchmedden and Cambusdoon, founded, July 24, 1873, this trust, with a fund of £500,000 sterling. Its objects are to help in the work of spreading the gospel in connection with the Church of Scotland, of building churches, endowing parishes, augmenting stipends, spreading sound literature, promoting religious education, assisting divinity students, and maintaining the 'B. Lecture.' The trustees must be members of the Church of Scotland, only one to be a clergyman; and the general design of the trust is to promote the territorial work of the National Church, and to maintain the great truths of the gospel as declared in the standards of the Church of Scotland.

Bairdia, a genus of crustacea belonging to the order *Ostracoda*, and represented by living as well as by extinct species. The fossil forms occur in the silurian, carboniferous, and permian rocks, and in the mesozoic and caenozoic formations also. See also CRUSTACEA.

Baireuth, or **Bayreuth**, on the Red Main, the capital of Upper Franconia, Bavaria, and 126 miles N. of Munich. It is well built, well paved, with many objects of ornament and interest, including promenades, fountains, and groves; two palaces, the old and the new; a monument to Jean Paul Richter, Schwanthaler, &c. A grand new opera-house for the performance of Wagner's music was completed at B. in 1875. B. has manufactures of porcelain, leather, and linen, woollen and cotton stuffs. Pop. (1871) 17,841. The history of the principality of B. (originally Kulmbach) is from the earliest times blended with that of Ansbach or Anspach (q. v.). After the death (1603) of the Markgraf Georg-Friedrich of Ansbach, the Franconian principalities fell to the younger sons of Johann Georg, Elector of Brandenburg. Joachim Ernst got Ansbach, and Christian got B. The latter removed his residence from Kulmbach to the town of B., which under him and his successors attained its greatest prosperity. In 1791 both principalities were sold to Prussia, from whom Napoleon wrested them in 1806, and in 1810 they

passed to Bavaria. See Lang's *Geschichte des Fürstenthums B.* (2 vols. Güt. 1801).

Baitul', or **Beitool**, a fortified town in India, in the Saugor and Nerbudda territory, Bengal presidency, about 100 miles N. W. from Nagpore. Pop. 4466.

Baja, a town in the district of Bacs, Hungary, situated on the Danube, 25 miles N. of Zombor. It lies in a rich vine-growing region, has an increasing trade, and is the site of a great yearly swine-fair. Pop. (1869) 18,110.

Bajan. See BEJAN.

Bajazet' (Bajazid), or **Bayezid I.**, called Ilderim or the Lightning, ascended the throne of the Ottoman (Osman) empire on the death of his father Amurath (q. v.) or Murad (the founder of the janizaries), who perished in conquering the Servians at Kossova, A.D. 1389. At this time the Ottoman empire comprised, besides what was originally allotted out of the Seljuk empire, the districts known as Khorasi, Kermian and Hamid, and also large portions of modern Turkey, the capital having been successively transferred from Prusa (Broussa) to Gallipoli and Adrianople. B. renewed the treaty made by his father with John V., the Byzantine Emperor, by which the latter acknowledged himself a vassal and tributary. He also removed, by strangling, his only brother Yakub Chelibi; a crime which became customary with later Ottoman sultans, and was defended by Turkish historians by the text in the Koran that 'commotion is worse than strangling.' Philadelphia, the last independent Greek community in Asia Minor, and the Seljuk districts of Muntesha, Aidin, and Serukhan, were soon added to B.'s empire. Wishing to make his supremacy nominal as well as real, B. invested Constantinople in the reign of Manuel. The siege was raised by the advance of Sigismund of Hungary and other Christian princes, whom B. defeated at Nikopolis in Bulgaria (28th November 1396). This victory was followed by expeditions to Thrace, Thessaly, and Greece, Wallachia, and Hungary. In spite of the bravery of Marshal Boucicault and his fleet, B., now master of nearly all Asia Minor, would have reduced Constantinople, had he not been called to the defence of his Asiatic possessions by the appearance of Timur, or Timur-leng (the lame Timur), who, after reducing Mesopotamia and Syria, was now threatening the borders of Asia Minor. The armies of B. and Timur met 30th July 1402, at Angora, when, in consequence of the disparity of numbers, the former were utterly routed, B. himself being taken prisoner and dying the next year in his captor's camp. The immediate result was, that several provinces in Asia Minor revolted from the Ottoman empire, and John Palaeologus, whom B. had placed on the Byzantine throne, retired in favour of Manuel to Thessaly. B.'s sons, Suleiman, Isa, Musa, and Mohammed all claimed the empire.

Bajazet' II., born 1447, became Emperor of the Turks in 1481 on the death of his father, Mohammed the Great. After getting rid of his brother, Prince Jau or Zizim, who fled to Rhodes and afterwards to France, B. checked the advance of the Mamluk sultans of Egypt, assisted the Moors of Spain against Ferdinand of Aragon, and in a successful campaign on sea and land forced the Republic of Venice to relinquish all claim to the mainland of Greece. After this he seems to have become a voluptuary, and was forced, chiefly by the janizaries, to resign in favour of his son, Selim I., the Severe, who had previously made an unsuccessful revolt against his father. Thirty days afterwards B. died (A.D. 1512). (See Von Hammer, *Geschichte des Osmanischen Reiches*; and Finlay, *Byzantine and Greek Empires*.) Racine's play of *Bajazet*, of which Corneille said: 'These Turks are very much Frenchified,' refers to the brother of Amurath IV. and Ibrahim I., who ruled in the 17th c.

Bajimont's Roll. This is the name of a valuation of the benefices of Scotland. It was called after an Italian ecclesiastic named Baiamund di Vicci, who was sent by the Pope in the 13th c. to collect tithes in Scotland. A copy of a portion of the original roll, applying to lands S. of the Firth, is preserved at Durham; and there is a copy of the whole, as adopted in the reign of James V., in the Advocates' Library in Edinburgh, in a MS. of the 17th c. Previous to the making up of the B.R., the Scotch clergy had been assessed according to a valuation roll called the *Antiqua Taxatio*, copies of which still exist in MSS. of the 13th c. In the Durham MS. the valuation in the B.R. is nearly 50 per cent. higher than in the *Antiqua Taxatio*.

Bajmak, a town in Hungary, about 16 miles S.W. of Maria-Theresopol by railway. Pop. (1869) 5610.

Bajoc'co, a copper coin, the 100th part of a scudo (4s. 3d.), and therefore equal to about an English halfpenny. The B. was a coin of the Papal States, but a Sicilian coin, of somewhat smaller value, has the same name.

Bajus (a Latinised form of the French *De Bay*), **Michael**, a Belgian theologian, born at the village of Melin, near Ath, in the province of Hainault, in 1513. He studied at Louvain, was appointed professor of theology there by Charles V. in 1550, and represented his university at the Council of Trent in 1563-64. His views of free will, original sin, and divine grace, in which he was a follower of Augustine, being thought to have a fatalistic tendency, eighteen of his propositions were censured by the Theological Faculty of Paris in 1560. Seven years later, seventy-six propositions were condemned by a bull of Pius V., when B. submitted. He again defended his doctrines, but was again condemned, and once more retracted. The Jansenists revived his views, which were known as *Bajanism*. In 1578 he was made chancellor of his university, and later was appointed General Inquisitor of the Netherlands. His works in 2 vols. were published by Gerberon at Cologne in 1696. B. died December 16, 1589, with the reputation of great learning and worth.

Bajza, Anton, born at Szücsi, 31st January 1804, belongs to the group of native Hungarian authors who in the period 1830-48 contributed in the most powerful manner to the political cause of a national language. The foundations of this literature had been laid by the *Magyar Museum* of Kazinczy and by the two Kisfaludis. It was carried on by Josiha and Eötvös, and other novelists; Vörösmarty and Petöfi, romantic and political poets; and by the Academy of Sciences, founded in 1830, in science. B. was not only a lyric poet of high order, and a critic, in the *Athenæum* and elsewhere, of the native literature, but also an industrious translator and compiler of historical and dramatic collections, chiefly from the German. His *Történeti Könyvtár* (Historical Library, 6 vols.) appeared at Pesth in 1843-5. There also he for some time directed the National Theatre, and edited Kossuth's *Uirlapja*, the organ of the Independent Nationalists, from the taking of the 'Long Parliament' in July 1848 till Windischgrätz took possession of Pesth. B. died March 3, 1858.

Baker, Sir Richard, a miscellaneous writer, born at Sissinghurst, Kent, about 1568; educated at Oxford; knighted in 1603; sheriff of Oxfordshire in 1620; died 18th February 1644 in the Fleet, in which he had been imprisoned for debt. His *Chronicle of the Kings of England*, the favourite reading of Addison's Sir Roger de Coverley, though destitute of historical authority, was once very popular. Sir Richard also wrote several theological treatises, and translated Malvezzi's *Discourses on Tacitus*, and Balzac's *Letters*.

Baker, Sir Samuel White, K.O.B., F.R.S., a distinguished African traveller, the son of Samuel B., Thorngrove, Worcestershire, was born in 1821. Educated as an engineer, he went to Ceylon at an early age. He soon showed himself to be fond of sport and adventure, and in 1854 and 1855 published two works, *The Rifle and Hound in Ceylon* (new ed. 1874), and *Eight Years' Wanderings in Ceylon* (new ed. 1874). In 1860 he married a young Hungarian lady, daughter of F. Von Sass, who has been the brave associate of his arduous wanderings. In 1861 he projected an expedition to Africa with the view of meeting Captains Speke and Grant at the sources of the Nile. After preliminary explorations he reached Khartûm, and then organised his expedition to the Great White Nile. Starting from Khartûm with a long train of attendants, he arrived at Gondoroko (1863), where he was joined by Speke and Grant, whom he relieved, and who informed him of the Victoria N'yanza, which they had discovered, and told him also that the natives had described to them another great lake. B. and his undaunted wife set out in search of this, and, after a number of remarkable adventures, arrived, March 14, 1864, at cliffs from which they obtained a sight of this other inland sea, which they named the Albert N'yanza, and which constitutes the chief reservoir of the Nile. B. in 1864 obtained for his relief of Speke and Grant the medal of the Geographical Society, and in November 10, 1864, was knighted. In 1869 he led an expedition of 1500 picked troops, under the auspices of the Khedive, and with the title of Pasha, to put down the White Nile slave trade, and succeeded in annexing Bari and Unyoro (within two degrees

of the equator) to Egypt. B. has written a number of works descriptive of his adventures and discoveries in Africa, of which the chief are the *Albert N'yanza* (1866); the *Nile Tributaries of Abyssinia* (1871); *Ismailia* (1874); *Cyprus as I saw it* (1879).

Bakeries, Army. Arrangements for supplying the British army with loaves instead of biscuits have only recently been made. The French and other Continental nations took a long lead of us in this respect. The Crimean war, in which British and French soldiers had excellent opportunities of learning lessons of friendly rivalry, occasioned the securing of this as well as many other comforts, and even luxuries, for our troops. In the calamitous winter of 1854 before Sebastopol, British soldiers would sometimes willingly barter for one pound of the bread served out to their French neighbours three or four pounds of biscuit. This and other similar occurrences during that war led to the great improvements which are now apparent in the B., as in all the other sanitary aspects of the British army. On the field large supplies of excellent bread are now produced, being baked in portable ovens. In the large garrison towns, and at camps—as in London, Portsmouth, Dover, Dublin, at Aldershot and the Curragh of Kildare—the system pursued in the field is, as nearly as possible, adopted. At almost all the small garrison towns of the United Kingdom, loaf bread is supplied to the troops by contractors, who are under the superintendence of the Control Department. The supply branch of the Army Service Corps, a subordinate part of the Control Department, is appointed to look after the bread and other articles of food for the troops. This corps is made up of bakers, butchers, &c., selected from the regiments, or enlisted for the sole purpose of provisioning. See **COOKERY, ARMY**.

Bake'well, an old town of Derbyshire on the Wye, near where it joins the Derwent, 25 miles N.W. of Derby, and 145 from London by rail. It lies in the heart of the fine scenery of N. Derbyshire, has chalybeate springs, and is a favourite resort of anglers. Near it are quarries of black marble, the polishing and inlaying of which is the chief local industry. The Duke of Rutland is proprietor of B., and has a seat in the neighbourhood. B. has an ancient cruciform church in various styles of architecture, which was restored in 1846 at great cost. There are also remains of a castle, built in 924 by Edward the Elder. Pop. (1871) 2283.

Bake'well, Robert, a famous English agriculturist, born at Dishley, Leicestershire, in 1726. He devoted himself to improving the breeding of cattle, aiming principally at producing the greatest weight of carcase with the smallest amount of feeding, and is to be regarded as the initiator of that system of scientific breeding which has made British cattle everywhere renowned. B. died October 1, 1795.

Bakhtegan', a salt lake in the province of Farsistan, Persia, which is nearly dry in summer, when the bottom becomes encrusted with a very fine salt. Circumference, according to Kinneer, 70 miles.

Baking, the process of drying and consolidating the parts of a body by exposure to heat in an oven or other closed chamber. Bread (q. v.) is baked in an oven; bricks, terra-cotta, pottery, and porcelain are in like manner hardened in a kiln; for a description of which processes see the various heads.

Bako'ny Wald, a mountain range in Hungary, stretching from the Platten See northwards to the Danube, and occupying a region 50 miles long and 20 broad. The highest point is Köröshegy, N. of Bakonybel, 2238 feet, and the average elevation is about 2000 feet. Only the central part is now covered with timber (chiefly beech and oak), the lower flats are cultivated; the hill slopes are clothed with vines and other fruit-trees, and the valleys contain numerous villages. Still vast numbers of swine are brought here annually to feed on mast, though the herdsmen are no longer the wild robbers of Hungarian song.

Bak'shish, a Persian word signifying a present, has acquired in Turkey, Egypt, and Syria a peculiar meaning in modern times. It is a fee which might be styled a compulsory gratuity. If a traveller in any of these countries receives any service, down even to the most trifling, he is not allowed to forget B., if the noisy shouting and repeating of the word can serve to remind him of it. Even when an ambassador at the Sublime Porte obtains an audience of the Sultan, or any of the high dignitaries, he has to pay B. to the menials in waiting.

Baktahi-Serai ('the palace of the gardens'), a town of Russia, government of Taurida, Crimea, near Simferopol. Pop. (1867) 11,448, mostly Tartars. The most remarkable building, the Khan Serai, or palace of the ancient Tartar khans, has been restored by the Russian government. There are some trifling manufactures of silk and of Turkish saddles.

Baku, a fortified town of Russia, government of B., Trans-Caucasia, on the S. side of the peninsula of Apsheron, Caspian Sea. Pop. (1867) 12,383, mostly Mohammedans. B. has a trade in naphtha, with which the soil of the surrounding district is impregnated. It exports besides salt, saffron, linen and woolen goods, &c. There is considerable trade carried on through the port of B. between Russia and Persia. B. has some fine mosques and bazaars. The town was founded by the Sassanidae in the 4th c., and has been successively conquered and possessed by Arabs, Tartars, Turks, Persians, Caucasians, and Russians.

Balaam, a prophet and poet of the Midianites, introduced in Numbers xlii. 5. He was the son of Beor, and dwelt at Pethor, a city of Mesopotamia, whence he was summoned by the messengers of Balak, King of Moab, to curse the Israelites, who were encamped in the plains of Moab. Though a Gentile, B. had a certain knowledge of the one true God, and a prophetic gift, which he seems to have exercised for gain. Whence had he this prophetic gift? It has been supposed that he was among the last of those belonging to the patriarchal age with whom God held direct communion. The miracle of the ass has been explained in various ways. Leibnitz and Hengstenberg suppose the event to have occurred in a trance; but Peter (2 Pet. ii. 16) seems to refer to it as an historical incident. B. seems to have practised divination, for in Numbers xxiv. 1 it is said that 'he went no more to seek for enchantments.' In a battle between the Israelites and Midianites, he sided with the latter, and was slain with five kings of Midian (Num. xxxi. 8).

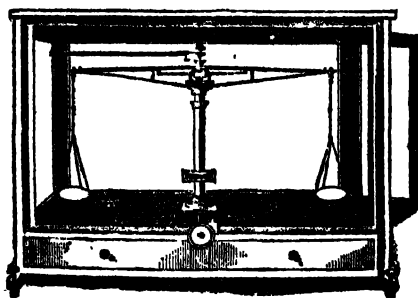
Bala Beds, a local deposit, near Bala, N. Wales, referred to the Lower Silurian of Murchison, and composed chiefly of hard crystalline limestone, in which trilobites and cystidæ predominate as fossils.

Bala'na. See WHALE.

Balaenoptera. See KOKQUAL.

Balaklava, a land-locked harbour in the S. W. of the Crimea, 6 miles from Sebastopol, the *Symbolon Limen* of Strabo. It is chiefly memorable for being the principal station of the English fleet during the Crimean war, 1854-55. England is not likely to forget the shameful exhibition of mismanagement and incapacity displayed by her commissariat, in consequence of which supplies of food, clothing, and medicine, stored in abundance at B., were for a time unavailable, while her soldiers perished by the hundred of needless privations. The cavalry charges of October 25, 1854, on the heights between B. and the Tchernaya, rank among the most disastrous and the most heroic achievements of the English army. Pop. (1867) 742.

Bal'ance (derivation doubtful, possibly from the middle Latin word *valentia*, denoting price or value), is an instrument for



Chemical Balance.

ascertaining the weight of any body, and is composed essentially of a rigid lever, called the *beam*, movable in a vertical plane round a central fixed point. A true B. must fulfil the following conditions: The arms of the beam must be similar and equal in size and weight, and the whole apparatus must be symmetrical with respect to the vertical axis through the point of support, and must have one, and only one, position of stable equilibrium. We thus see that the centre of gravity, or the centre of inertia of the B., must be *below* and in the same vertical line with the point of support. If one arm be

longer than the other, the B. is false; but we may obtain the true weight of a body by means of it by two methods—either by double-weighing, *i.e.*, by replacing the body, previously counter-balanced by some material in the other scale, by known weights, until the equilibrium be again restored; or by weighing the body first in the one, then in the other scale, and finding the geometric mean of the two apparent but false weights, which mean is the true weight.

An important desideratum in a delicate B., such as the common chemical B. employed universally in laboratories, is its *sensibility* to the addition of a small weight to one of the scales. This sensibility in the first place obviously depends upon the friction at the point of support of the beam and the points of suspension of the scales. Accordingly, it being desirable to lessen this friction as much as possible, the beam is poised upon a knife-edge working on an agate, and the scales are suspended in a similar manner. Again, by increasing the length of the arms, we increase the leverage at the extremity of the arm, and thus make the B. more sensible; and this same effect is also produced by raising the centre of inertia, since by decreasing the distance from the fulcrum of the point at which the weight to be moved is applied, the leverage at the other extremity is proportionately increased. There is, accordingly, in the finer balances, an arrangement for varying the sensibility, by altering the position of the centre of inertia, consisting of a vertical screw surmounting the beam at the centre, along which a weight may be moved either up or down. Generally a bar with projecting pegs is added, which is capable of raising the beam and scales, so as to leave the knife-edges free, and thus keep them in good condition.

In commercial life, however, such a B. as above described would be practically useless, on account of the long time it would take to come to rest, its *stability* being small. As the conditions for stability are nearly opposed to those for sensibility, it is obvious that one of these must be sacrificed to the other.

Of other kinds of balances, we may mention the *Roman B.*, or *steelyard*, the *Danish B.*, and the *bent-lever B.* The steelyard is a lever of unequal arms, the weight being applied at the shorter arm, and the power movable along the longer arm, which is graduated usually by experiment. The Danish B. differs from this in having the fulcrum, not the power, movable. In the bent-lever B. again, the body to be weighed is, as above, attached to the shorter arm, but the weight is shown by the distance described before a graduated arc by the longer arm, to which the power is permanently fixed.

Bal'ance, and **Bal'ance-Spring**, are those portions in the mechanism of a watch which regulate the beat and secure uniform motion. The B. is a delicately poised wheel or ring, with most of its mass accumulated in the rim, and so connected with the spiral or helicoid spring that, when displaced from its position of rest, it acquires an oscillatory motion, from the alternate contractions and expansions of the spring. With the same length of spring, the time of vibration is directly proportional to the distance of the centre of gyration (see CENTRE OF GYRATION) from the axis, and consequently varies with temperature. The *compensation B.*, however, meets this difficulty by taking advantage of the unequal expansion of two different metals. The ring is divided into two or more segments, one extremity of each of which is connected with an arm of the B., while the other extremity, which is quite free, has attached to it a weight. Each arc consists of two laminæ of different metals fused together, with the more expansible to the outside. Upon a rise of temperature, the radii of the wheel expand, but at the same time the weights at the free ends of the arcs are brought nearer the centre, since the arcs become more curved owing to the greater expansion of the outside ring. With a fall of temperature exactly the reverse takes place; and by this method very exact compensation may be obtained.

Bal'ance-Fish. A name applied to the *Zygana malleus*, or hammer-headed shark, so named from the shape of the head, the eyes being placed at the extremities of the elongated head. See SHARK.



Balance-Fish.

Bal'ance of Power, an expression much more used in diplomacy in the 18th and beginning of the 19th c. than it is now,

denotes a state of matters in which no one of a community of nations is allowed to possess such power as to interfere with the independence of the rest. The idea of such an arrangement probably existed from a remote period of antiquity, and in Greece in particular caused alliances against the paramountcy of in turn Athens, Lacedæmon, and Thebes. The idea was first, however, formally recognised in Europe as a sound one, and in its name those wars originated which humbled the power first of Spain after the time of Charles V., and of France during the reign of Louis XIV. It may be said to have been the B. of P. that wrested Europe from Napoleon I., and in 1854 waged the Crimean war, and saved Turkey from the aggressions of the Czar Nicholas. Since the Treaty of Paris (1856), however, the idea of the B. of P. seems to have to some extent lost its hold upon the European, and especially the English mind. Three wars which have taken place since that date, between Austria and Sardinia, aided by France, in 1858, between Austria and Prussia in 1866, and between France and Germany in 1870-71, have very materially altered the power of Europe, and yet the changes that were made were effected without any great consultation on the subject of the B. of P. by the five great powers. The last event suggestive of the old idea was the agreement in 1871 of the powers consenting to the Treaty of Paris, by which the clause in it prohibiting Russia from maintaining a naval power on the Black Sea was practically rescinded. Something very like the European B. of P. is at present maintained in Asia by arrangements between the two dominant powers, Britain and Russia, and the weaker states, such as Persia and Afghanistan, by which the independence of the latter is guaranteed.

Bal'ance of Trade. The difference between the money value of the exports and imports of a country is called the 'balance of its trade,' and this balance is said to be 'in favour' of the country or 'against' it, according to the excess of either the former or the latter. The expressions quoted indicate ignorance as to the causes and sources of the wealth of nations; and seem to proceed upon the notion that trade is like a game of cards; at which, if one gains, another must lose correspondingly. The B. of T. regulates rate of exchange (see EXCHANGE), but no conclusion can be drawn from it either as to the positive gain of a country, or as to its gain relatively to that of the country with which the balance arises. If England takes the value of a million sterling of raw cotton from America, manufactures it, sends it back and sells it in America for £1,250,000, America will then owe England £250,000, but it will not follow that England is £250,000 richer by the transaction, nor that America is poorer. England may have made a bad speculation, and the quarter of a million may not pay the costs of production and transport. Were this so, it would arise from over-trading—from England having sent to America more manufactured cotton than can be disposed of at a remunerative price. Suppose, however, that the transaction is a good one for England, and that the £250,000 is a gain to us, there will then, no doubt, so far as this one transaction can be supposed to have influence, be a tendency of gold to drift from America to England; but there will be an increased demand for raw cotton, and labour in America is thereby stimulated to the production of real wealth. The debt of £250,000 of America to England will be largely utilised in paying for this by bills, and will thus never cross the Atlantic; and to the extent to which it does cross, it will be employed by manufacturing England in stimulating production in other foreign countries; which countries may again, in consequence, increase their demand for American cotton. It is thus that the creation of wealth in one country tends not to impoverish another country with which it has commerce, but to enrich that country. The more that France takes of the cottons of Manchester, and of the woollen goods of Bradford, the more of French wine will be consumed in Manchester and Bradford.

Bala'nophora'ceæ, an order of peculiar leafless plants found growing parasitically on the roots and stems of trees, principally in tropical countries, and having a fungus-like appearance. The *Fungus Meliænsis* of Malta (*Cynomorium coccineum*) is celebrated for arresting bleeding. The famous *Rafflesia* (q. v.) of Java belongs to the order. The genus *Balanophora* is the type of the order. *Cytinus hypocistis* is a common parasite on the roots of species of *Cistus* in the S. of Europe, and contains gallic acid. Some authors make B. a sub-order of *Rhizanthææ*.

Bal'anus, a genus of crustaceans included in the order

Cirripedia of that class, and represented by the familiar 'sea-acorns,' which stud over the rocks at low-water mark around all our coasts. These forms are sessile or unstalked, and are fixed directly to rocks by the base of the shell. The shell of each B. is conical in form, and is developed by limy secretions formed by the first three segments of the body of the animal. The animal is situated head downward within its shell, and is attached to the flat plate or 'basis,' forming the floor of the shell. This latter structure is composed of six pieces, and opens superiorly in an aperture guarded by a movable lid, the *operculum*. The joints of the chest or thorax bear six pairs of appendages, each of which is divided into two filaments; and the twenty-four ciliated filaments, or *cirri* as they are termed, representing the limbs of other crustaceans, are capable of being protruded from and retracted within the shell. These filaments constitute the 'glass-hand' of the 'sea-acorns,' and being continually protruded from the shell, serve by the currents they create in the water to bring particles of food to the mouth. From the presence of the *cirri* the name of the order—*Cirripedia* ('cirrus-footed')—is derived. The young first appear as free-swimming, locomotive larvæ, known as *Nauplii*; which moult, and become pupæ. In these states eyes are present, as also are limb-like appendages. Finally these locomotive forms settle down, attach themselves to fixed objects, and each, developing a shell, loses the eyes, has the limbs converted into *cirri*, and becomes an adult B. *B. sulcatus* is a familiar species; as also are *B. perforatus*, *B. porcatus*, *B. crenatus*, &c. *B. tintinnabulum* and *B. psittacus*, both large species, are eaten, the former in China, the latter in Chili. The ancients esteemed the flesh highly. (See also CIRRIPIEDIA, BARNACLES, &c.)

Balasinore', or **Balasinur**, the capital of a *jaghire* or petty Indian native state of the same name, Rewa Kanta Agency, Bombay, India, is situated on the river Sheri, about 51 miles N. of Baroda. Pop. (1872) 8836. The native ruler (the Nawab) pays a tribute of £1000 to the British Government. B. has an area of 150 sq. miles; pop. (Government Report, 1873) 41,984.

Balasure' (*Baleswara*, 'young lord'), the chief town of the district of the same name in Orissa, Bengal, British India, 123 miles S.W. of Calcutta. The Portuguese, Dutch, and Danes successively had factories here, and it was not till 1846 that it passed under English rule. Pop. (1872) 18,268. The district of B. has an area of 2066 sq. miles, and a pop. (1872) of 770,232. The one crop is rice, which is largely exported to the Maldives and Laccadive Islands.

Balata Gum, the milky juice which exudes from *Sapota Müllerii*, a large tree which grows in tropical America. The juice quickly hardens on exposure to the air, and, in its solid state, in appearance, properties, and uses it is similar to gutta-percha, for which it can be used as a substitute.

Bal'aton Lake, in Ger. *Platten-See*, the most important lake in Hungary, and the largest in the S.E. of Europe, lies to the S.W. of Pesth. Its greatest length is 46 miles; its average breadth, 7 miles; its area, with that of the frequently inundated marshes, variously estimated at from 250 to 420 sq. miles; and its greatest depth from 36 to 39 fathoms. B. abounds with fish; and iron-sand, containing small garnets, rubies, amethysts, &c., is found in it. The hills surrounding its N. sides are clad with woods and vineyards. When frozen in winter it forms a valuable means of intercommunication. The most interesting places on the lake are the Abbey of Tihany, the town of Füred on the N. shore, and the village of Keszthely on the W. shore. B. is often mentioned in the Magyar legendary ballads of the dark ages and the later Turkish wars.

Balausta. See BERRY.

Bal'bek, or **Bal'bec**. See BAALBEK.

Bal'bi, Adriano, a celebrated geographical writer, was born at Venice, April 25, 1782. He was made professor of geography in 1808 at Murano; in 1811 was appointed professor of physics at Fermo, and received a call to the chair of statistics at Padua in 1815, which, however, he declined. In 1820 he married an actress and retired to Portugal, where he collected the varied and valuable materials given to the world in his *Essai statistique sur le Royaume de Portugal et d'Algarve, comparé aux autres États de*

l'Europe (2 vols. Par. 1822), and *Varités politiques et statistiques de la Monarchie Portugaise* (Par. 1822). In 1822 he went to Paris, where he produced his chief works, the *Atlas ethnographique du Globe, ou Classification des Peuples anciens et modernes d'après leurs Langues* (1826), and the *Abrégé de Géographie* (Par. 3d ed. 1850; Ger. translation by Arendt, 1870), which has been translated into the principal languages of Europe. B. received a grant from the French government, and in 1832 retired to Padua. He died at Venice, March 14, 1848. His son, Eugenio B., collected his *Scritti geografici* (5 vols. Turin, 1841-42).

Bal'bi, Gasparo, a Venetian jewel-merchant, who visited India (1579-88), and on his return published a singularly interesting account of his travels, under the title of *Viaggio nelle Indie Orientali* (Venice, 1590). A Latin translation of this work appeared in the *Descriptio generalis totius Indue Orientalis* by the brothers Jan Theodorus and Jan-Israel de Iby (Frankf. 1598-1628).

Balbi'us, Decimus Cælius, one of two Roman emperors elected by the senate and invested with equal power, on the death of the elder Gordian and his son, to resist Maximin advancing on Italy with the legions from Germany. But though the choice of the senate, B. and his colleague, Clodius Pupienus Maximus, were not the choice of the Prætorians, who cherished the most implacable resentment against both. While Maximus, who was a severe, but brave soldier, went to fight Maximin, B. remained at home to govern the empire, but proved himself incapable of quelling the factions of the city. On the return of the victorious Maximus, the two emperors tried hard to govern wisely and well, but military insolence and insubordination proved too much for them, and they were murdered by the Prætorians in a savage outburst of rage and disloyalty, A.D. 238.

Bal'bo, Count Cæsare, a distinguished Italian politician and author, born at Turin, 4th November 1789. When only eighteen he was appointed by Napoleon I. auditor of the Council of State in Paris. In 1812 he acted as commissioner for the Illyrian provinces that fell to France by the Peace of Vienna. On the fall of Napoleon he devoted himself to literature, his first work being a history of Italy to the time of Charlemagne. His reputation was established beyond the limits of Italy by his *Speranze d'Italia* (1843), which did much to create the monarchical Piedmontese party, in opposition to the republican party, of which Mazzini was the leading spirit. B. also wrote a compendium of Italian history, *Della Storia d'Italia dall' Origine l'ino al 1814* (11th ed. 1859), and other works of less moment. He died 3d June 1853. He was a man of pure and sterling character, who loved his native land, with its great history and its famous Church, and who had a profound dislike of the destructive spirit of Continental liberalism. See Ricotti, *Della Vita e degli Scritti del Conte Cesare Balbo* (Flor. 1856).

Balbo's, Vasco Nuñez de, the discoverer of the Pacific Ocean, and one of the famous Spanish *conquistadores*, was born of a noble but poor family, at Xeres-de-Badajoz, in 1475. He volunteered in the expedition of Bastidas to the New World in 1501, established himself shortly afterwards as a planter in St Domingo, became involved in debt, and, in order to escape the law, had himself rolled in a barrel on board a ship bound for the Gulf of Darien. B. soon rose to the command of the expedition which he had thus joined, and landing on the Isthmus of Darien, he marched into the interior, and on the 29th September 1513, having crossed the isthmus, after travelling a month, he first beheld the immense expanse of the Pacific Ocean. Davila superseded him in the rule of the newly discovered territories in 1514, and although B.'s enterprises were rewarded with success, and his services to his country were great, the new governor continued to persecute him, and at length, having subjected him to a form of trial for rebellion, had him condemned and beheaded at Castile d'Or in 1517.

Balbriggan (Ir. Gael. 'city of Breacan'), a seaport and watering-place in the county of Dublin, 22 miles N.E. of Dublin, with some manufactures of linen and cotton embroidered goods. B. hosiery is famed. The town is a station on the Dublin and Drogheda Railway. Pop. (1871) 2332.

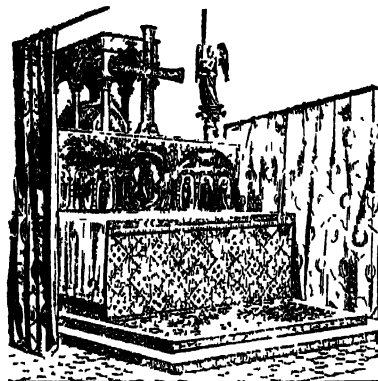
Balbuena, Don Bernardo de, one of the most distinguished epic poets of Spain, was born at Valdepeñas in 1568, sailed for

the New World at an early age, and completed his studies for the Church in a college of Mexico. Returning to Spain in 1608, he was soon after appointed provost of Jamaica, and in 1620 Bishop of Puerto Rico, where he died in 1627. Of his works we possess only three—*La Grandena Mexicana* (Mex. 1609; Madr. 1829), a poetical description of the Mexican capital; *El Siglo de Oro* (Madr. 1608), a pastoral novel in prose and verse; and *El Bernardo, ó la Vittoria de Roncesvalles* (Madr. 1624, best ed. 1808), an epic poem in 24 books, the great merits of which have only recently been recognised. It is full of originality of design and execution; yet amidst all its fire and fancy there is a wonderful simplicity and naturalness.

Bal'cony (It. *balcone*), a gallery thrown out from a building, and usually placed in front of windows. The B. originated from the projecting galleries on fortified buildings used for throwing boiling tar or offensive missiles on besiegers. Balconies were not applied to private houses before the 15th c.

Bal'cony, in nautical language, is a gallery outside the stern of a large ship. In three-deckers there are two—the lower connected with the admiral's state-cabin, the higher with the captain's.

Baldachin, or **Baldachi'no**, in ecclesiastical language the dome or canopy which is stretched over the high altar. It is usually a highly ornamental structure, made of marble, wood, bronze, or precious metals. In early times the B. was known as the *aborium*, and used as the receptacle for the consecrated host. The name is also to some extent used, like the English term *canopy*, to distinguish any overarching covering, and so applied to the projecting niches over doorways, windows, to



Altar with Baldachin, from St Denis.

mantelpieces, and to the tops of old tester-beds. Baldachins are also erected over tombs, and the canopies which Italian bishops place over their ecclesiastical chairs are so termed. Portable baldachins were carried over monarchs in their coronation processions; and in the East, such a canopy is a necessary adjunct to all state processions.

Bal'der, Bal'dur, or **Balldr**, a Scandinavian divinity, with whose name are associated the ideas of brightness, beauty, peace and purity. He is the son of Odin, and brother of Thor, and falls a victim to the spirit of evil contention and fraud, represented by Loki, the foster-brother of Odin. How this happens is related in the 49th chapter of the *Prose Edda*. Before the arrival of Loki in Asgard, the Aesir (q.v.) had lived in peace. B. in particular, living in Breidablið, the mansion into which nothing unclean can enter, is the subject of praise from all mankind: like those of his son Forseti, living in Glitnir (the house of justice), the judgments of B. can never be altered: rays of light issue from his person; the whitest of plants is called *Balder's-brow* (the Swedish *Balduströa* or *Anthemis cotula*). B. has dreams of evil. His mother Frigg exacts from all nature an oath against injuring B., but she omits the mistletoe growing on the eastern side of Valhalla. Loki, who has already shown his cunning in the recovery of Thor's hammer, discovers this, and, when the Aesir are amusing themselves in the Peacestead, by hurling darts at B. in sport, he persuades Hödur (the

strong, but blind, god) to cast a piece of mistletoe at B., whom it kills, his wife Nanna (the Maiden) dying of grief. Hermod the Nimble then rides to Hel, where all those not dying in battle go, to ask from Hela (Death), a daughter of Loki, that B. may return to Asgard. This is granted, provided all things weep for him: a proviso taken advantage of by Loki, who, disguised as Thauht, refuses to weep. In the meantime the funeral of B. takes place, the pyre being placed on board his ship. The frost-giants, as well as the gods, are present. The gods then pursue Loki, whom they finally capture and confine in a cave under torments like those of Azael and Prometheus. This will endure until the catastrophe of Ragnarök and the renovation of the world, when B. is to leave Hel and come to Ida, where Asgard formerly stood. There probably is in this legend a mixture of physical and moral allegory. See the works of Thorpe and Müller, and Blackwell's translation of the *Edda*.

Bald'ness. See ALOPÉCIA.

Bal'do, Mon'té, a mountain of Venetia, N. Italy, on the E. shore of Lake Garda, 18 miles N. of Verona. It is 7100 feet high, is notable for its petrifications, and also for its fine green-coloured 'sand of Verona.'

Bal'drick (Fr. *baudrier*, from Low Lat. *balterarius*, deriv. of *baltus*, the 'belt' of the Roman soldier), a broad belt which in mediæval times was worn from either shoulder diagonally across the body, either as an ornament or for carrying arms, horn, or other implement. The custom is alluded to by Spenser:—

'Athwart his breast a baldrick brave he bare,
That shined like twinkling stars with stones most precious rare.'

The B., as indicated in these lines, was frequently highly ornamented, and decorated with precious metals, gems, &c. The B. is often confounded with the military belt or belt of knight-hood, which, being a waist-belt only, is quite distinct.

Bal'dung, Hans, or **Hans Grun**, born at Gmünd, Swabia, in 1470, died at Strasburg in 1552, a painter and engraver of much merit. His chief works are the pictures in the nunnery of Lichtenthal, Baden (1496), and the altarpiece in the Minster of Freiburg (1516), which are splendid specimens of old German art. Other pieces by B. are to be seen at Aschaffenburg, Basel, Berlin, Karlsruhe, Ludwigsburg, Nürnberg, Vienna, &c.

Bald'win (Fr. *Baudouin*), the name borne by nine Counts of Flanders, the first of whom, Baldwin *Bras-de-Fer*, married Judith, daughter of Charles *le Chauve*, and died in 879; and the last, a contemporary of Philippe Auguste, took the cross in 1201. By far the most notable of the nine, however, was Baldwin V., surnamed of Lille, or *le Dbonnaire*, who died in 1067. He carried on a bloody strife with the German emperor, Heinrich III., made the famous canal Fosse-Neuf, which separates Artois from Flanders, was Regent of France from 1060, during the minority of the French king, Philippe, and assisted the expedition which placed the crown of England on the head of his kinsman the Duke of Normandy.

Bald'win I., Latin King of Jerusalem, was born in Flanders in 1058. He was descended from Baldwin, fifth Count of Flanders, and shared in the first crusade under his famous brother, Godfrey of Boulogne. But he was thoroughly worldly and ambitious, and having obtained the principality of Edessa, left the crusaders to conquer the Holy City. In 1100 he succeeded his brother Godfrey as King of Jerusalem, and fought with great valour and success along the Syrian coast, capturing Acre, Beirout, Sidon, and other places. He died on his march back from Egypt to Palestine, at a spot in the desert called Laris, 1118.—**B. II.**, cousin of the preceding, and eldest son of Hugues, Count of Bethel, was King of Jerusalem from 1118 to 1131. After defeating the Saracens in several engagements, he was taken captive in 1124, and was a prisoner for six months. Though not always successful in his wars, he left the kingdom of Jerusalem much enlarged at his death. During his reign the Knights of St John and Knights Templars were instituted. He died August 21, 1131, and was succeeded by his son-in-law, Foulques of Anjou.—**B. III.**, King of Jerusalem 1143–62, son of Foulques of Anjou, born 1130, was the *beau idéal* of a knight. On several occasions he fought successfully against the Sultan of Aleppo, and was popular at once with Christians and Moslems. His death, occasioned it is believed by poison, took place 1162.

His brother Amaury, who succeeded him, died in 1173.—**B. IV.**, son of Amaury, born 1166, was king from 1173 till his death in 1183. During his feeble rule Saladin made rapid progress, wresting from the Christians large portions of their territory. He was succeeded by his nephew, **B. V.**, who died in 1187 of poison, administered, it is said, by his mother Sybilla, that she might secure the throne for her second husband, Guy of Lusignan.

Bald'win I., first Latin Emperor of Constantinople, a descendant of Charlemagne, and a cousin of the French king, was the son of B., Count of Hainault, and of Marguerite, Countess of Flanders. Born at Valenciennes in 1171 A.D., he took the cross in 1200, and in 1202 assisted Alexius, son of the Emperor Isaac II., to recover Constantinople from his uncle, Alexius Angelus, who, after blinding Isaac II., had usurped the government. The crusaders dethroned the usurper, and finding Alexius unable to give them the reward agreed on, turned their arms against him. They sacked the city, and B. was crowned emperor, 9th May 1204. He received, however, only a fourth of the empire, the Venetians, and the other French and Lombardian barons, retaining the remainder. The discontented Greeks, assisted by the Bulgarian king Calo-Joannes, having made an insurrection, and massacred the Latins who were dispersed throughout Thrace, B. besieged them in Adrianople, but being defeated and taken prisoner, he died a captive in 1205. 'The manner of his death,' says Gibbon, 'is variously related by ignorance and credulity. The lovers of a tragic legend will be pleased to hear that the royal captive was tempted by the amorous queen of the Bulgarians; that his chaste refusal exposed him to the falsehood of a woman and the jealousy of a savage; that his hands and feet were severed from his body; that his bleeding trunk was cast among the carcases of dogs and horses; and that he breathed three days before he was devoured by the birds of prey.' See *The Decline and Fall of the Roman Empire*, chap. 61.

Bald'win II. fifth and last Latin Emperor of Constantinople, was born in 1217. He was the son of Pierre de Courtenay, Count of Auxerre, the brother-in-law of B. I. Pierre was singularly unfortunate. After being crowned by the Pope as the successor of Constantine, he set out for the East, but was seized and put to death on his journey by the despot of Epirus. His second son, Robert, a pusillanimous youth, was chosen in his stead, but his reign (1221–28) was an era of calamity and disgrace. The third son, B. II., was still too young to rule, and Jean de Brienne, the hero of the Egyptian crusade, and the titular King of Jerusalem, a veteran of fourscore years, was invested with the dignity of an interim emperor. On his death in 1237, B. II. received the purple. But the foreign empire had lost its vitality, and B. was no more a hero than his brother. Of the twenty-four years of his reign, the greater part was spent abroad in mendicant visits to the European princes, on whose bounty he was glad to live. At last he was driven from his capital by Michael Palæologus (q. v.), and in July 1261 the Latin empire of Constantinople came to an end, after a duration of fifty-seven years. The remaining thirty-three years of B.'s life (he died in 1274) were spent in vain attempts to induce the Catholic powers to join in his restoration.

Bâle. See BASEL.

Bale, John, Bishop of Ossory in Ireland, was born at the village of Cove, in Suffolk, 21st November 1495. Although originally educated as a Carmelite monk, he became an extremely violent Protestant at the University of Cambridge. His language on this point is amusingly vivid. 'And that I might never more serve so execrable a beast (the wicked Antichrist) I took to wife the faithful Dorothy.' In 1540 he thought it prudent to remove to Holland, where he lived for eight years. On the accession of Edward VI. he was presented to the living of Bishopstoke in Hampshire, and in 1552 to the bishopric of Ossory. He was so much hated by the Catholics, that, on the death of King Edward, his house, he tells us, was attacked, and five of his servants killed. He again fled to the Continent, and lived for a time at Frankfurt-on-the-Main and Basel. On Elizabeth's accession he returned to England, and was appointed to a canonry in the Cathedral of Canterbury. He died in 1563. A list of his works, ninety in all, is to be found in Cooper's *Athens Cantabrigienses*. B. was probably the last Englishman

who wrote miracle-plays, which he used as an instrument in his rancorous warfare with Roman Catholics. Even the Protestant Fuller nicknames him 'Bilious B.' (*Bilius Baleus*). His most important work is a collection of British Biography, written in Latin, and entitled *Illustrium Majoris Britannie Scriptorum, hoc est, Anglia, Cambria, et Scotia, Summarium* (best ed. Basel, 1557-59). The great value of this work arises from the use B. made of the monastic libraries just before their dissolution.

Balearic Isles, comprising Mallorca (Majorca), Minorca, Iviza, Formentera, Cabrera, and some islets, lie in the W. part of the Mediterranean, and to the E. of Spain, in lat. $38^{\circ} 4' - 40^{\circ} 5' N.$, long. $1^{\circ} - 5^{\circ} E.$ They now form a Spanish province; area, 1753 sq. miles; pop. (1867) 284,398, a large number of whom are employed in the tunny, anchovy, and sardine fisheries, and in the olive culture. The coasts are rugged, but there are excellent harbours. Capital, Palma, from which to Inca, a distance of 25 miles, a railway was opened in 1874, and is being continued as far as the Port of Alcudia. The name is generally derived from the Greek *ballein*, to throw, the natives having been expert in the use of the sling; but Strabo gives it a Phœnician origin, which is substantially of the same import. Aulus Cæcilius Metellus (who took the name of *Balearius*) annexed the B. I. to Rome in 123 B.C. They subsequently passed under the rule of the Vandals (426), Visigoths, Arabs (798), and the Almohades (1208), and were finally united with the crown of Aragon in 1343. See *B. I.*, by the Tuscan Archduke Luigi-Salvatore (vol. I. 1869).

Baleen, the term applied to the horny plates attached to the palate of the *Balenida*, or whalebone whales, and which constitute the 'whalebone' of commerce. The baleen-plates are arranged in a double row on the palate, and depend into the cavity of the mouth of the whale. The length of the largest plates averages from 10 to 14 feet; whilst in number about 200 plates exist on each side of the mouth. This huge fringe acts as a kind of sieve or strainer in serving to prevent substances of large bulk from gaining access to the throat, and also in entangling the minute forms upon which the whale feeds.

Balfé, Michael William, a British musician, was born in Dublin, 15th May 1808. He displayed remarkable musical talent as a boy, and when only sixteen conducted the orchestra at Drury Lane Theatre. He afterwards studied music in Italy, and devoted most of the rest of his life to composition. In 1845 he was made conductor of the Italian Opera, Covent Garden. His principal works are operas, of which he wrote a great number. The best-known are *The Bohemian Girl* (1844) and *The Rose of Castile* (1857); but neither these nor the others possess any great merit or originality. His latest productions were *Satanella*, *The Puritan's Daughter*, *Blanche de Nevers*, and *The Sleeping Queen*. B. was an ardent disciple of Paër and Rossini, an imitator of Auber, and a rival of Adolphe Adam. He died 22d October 1870. See *Memoir of B.* by C. L. Kenny (Lond. 1875).

Balfour, Sir James, Lord President of the Court of Session, and son of Sir Michael Balfour of Pittendreich, in Fifeshire, was one of the most dubious politicians of the Reformation period in Scotland. He at first took part in the conspiracy against Cardinal Beaton, and was even sent to France along with John Knox. He subsequently, however, changed his religion, and was in consequence called by Knox 'Blasphemous B.' He was an accomplice in the assassination of Darnley and a friend of Bothwell, then threw over both Bothwell and Mary, giving up certain letters to the confederate Scotch lords upon which Mary's guilt was founded. Similarly he curried favour with Morton when he was made regent, and yet he was instrumental in obtaining Morton's death by producing the deed compassing the death of Darnley. During this strange political career, B. succeeded in achieving considerable personal and professional success, attaining in the end the Lord Presidentship of the Court of Session, with a pension of £500. He received a commission from Regent Morton to make a general report of the law of Scotland, and his *Prædicts of Scots Law* is still recognised as a very able work. B. died in 1583.

Balfurush (properly Barfurush, i.e., 'lading mart'), a town on the river Bahbul, province of Mazanderan, Persia, 12 miles S. of the Caspian. There is a good road from the port of 256

Meshhed-Ser to B., which is the great market between Russia and Persia, and has a splendid bazaar, a mile in length. The principal products of the fertile plain in which B. stands are sugar, rice, and cotton. The pop. is said to range from 150,000 to 200,000.

Bali, or **Bally**, an island E. of Java, 70 miles long and 35 miles broad. The soil produces two crops annually, and supports a pop. of 450,000, among whom are many Chinese. Area, 1530 sq. miles. B. is volcanic, one of the loftiest mountains having been active as late as 1843. The island has belonged to the Dutch since 1846.

Bal'iol, Edward, son of John B. (q. v.), accompanied by a few English knights, landed at Kinghorn in 1332, during the regency of Donald, Earl of Mar, whose forces he routed with immense slaughter at Dupplin Moor in Perthshire, and was crowned at Scone on September 24th. Three months after, being surprised in his camp at Annan, he fled to England, and died at Doncaster in 1363, after an ignoble, spiritless, and unfortunate life.

Bal'iol, John, Lord of Galloway, grandson of Margaret, eldest daughter of David Earl of Huntingdon, brother of William the Lion, and one of the competitors for the Scottish crown on the death of the Maid of Norway in 1290. The arbiter, Edward I. of England, previously acknowledged by the Scottish Estates to be overlord of Scotland, decided in favour of B., who was enthroned at Scone, 30th November 1292, and did homage to Edward at Newcastle on the 26th of December. In 1295, indignant at finding himself merely a nominal king, he concluded an alliance with France. For this Edward, after a three months' campaign in Scotland, in the course of which he subdued nearly the whole country, compelled B. to surrender the crown, July 2, 1296, and imprisoned him in the Tower for three years, after which he was allowed to withdraw to Normandy, where he died in 1314.

Balists, or **Ballista** (Gr. *ballin*, to throw), a military engine for propelling weighty missiles, for the working of which two men were required. The machinery consisted either of strong elastic cords, or a peculiar arrangement of levers. The statement of the ancients, that the B. could propel a weight of 360 pounds, must be received with caution. During the middle ages, and before the use of gunpowder in war, various analogous contrivances were known, as the *mangonel*, *trebuchet*, *petrary*, &c.

Balistes, or **File-Fish**, a genus of fishes included in the *Plectognathous* section of the order *Tleosteii*, and popularly known as 'file-fishes' from their possessing strong spines in connection with the first dorsal fin, these spines bearing toothlike processes, and thus exhibiting a filelike conformation. The skin is covered by rough, hard, granular scales, the skin itself being of tough consistence. The filelike spine in some species is articulated upon a bone belonging to the head, and in such cases can be retracted at will within a special groove of the supporting bone. When erect and protruded, the spine is fixed by interlocking with a projection on the adjoining spine, whilst it is released by the depression of the interlocking and smaller spine. A second and complete dorsal fin exists. The ventral fins may be spiny. Cutting teeth exist in both jaws. The body is short and compressed, and often brilliantly coloured. *B. capricus* is found in British seas; *B. pincilligerus* and *B. geographicus*, more typical species, occur in the seas of the tropics.

Balistraria, narrow apertures in castle walls, having the lower terminations generally circular, but sometimes in the form of a shovel, through which the crossbowmen shot their arrows. They are not known to have existed earlier than the 13th c., and correspond to the loopholes subsequently used by sharpshooters. See **LOPHOLES**.

Balise, or **Belize**, better known as British Honduras, a territory in the S.E. of the peninsula of Yucatan, Central America, bounded on the W. by Guatemala, with some 80 miles of coastline along the Gulf of Honduras in the Caribbean Sea. Area, 3500 sq. miles; pop. (1870) 24,710, of which 24,333 were coloured, about half the entire number belonging to the capital. It is exceedingly fertile, in part mountainous, and is watered by several rivers, the chief of which are the Balise, Rio Hondo, and Siboon. The climate is hot and humid, but is

tempered by the regular sea-breeze. The capital, B., stands at the mouth of the navigable river of the same name, and is an important depôt for goods destined for the interior. The chief exports are mahogany, sugar, logwood, coffee, and indigo. Exports (1873), £200,869; imports, £161,191. After many years' occupation of B., the English possession was formally recognised by the Spaniards in 1783.

Balkan (Arab. 'high ridge'), anciently **Hæmus** (the wintry or snowy mountains: comp. Gr. *cheima*, and Lat. *hiems*, winter; also Sansk. Himalaya, 'abode of snow'), the most eastern branch of the great alpine system of Central Europe, extends from the plain of Sophia to the Black Sea, separating Bulgaria from Rumili, and forming the watershed between the Danube and the Maritza. Tchar-dagh (9700 feet), in the western part, is its highest peak. The B. is crossed by six roads, over as many passes, the most important of which is the Porta Trajani, which forms the overland route between Vienna and Constantinople.

Balk'ash, or **Tengiz'**, called by the dwellers on its shores *Al-Dengis* (white sea), or *Ala-Dengis* (speckled sea), lies on the frontiers of the W. Siberian territory of Semipalatinsk and the steppes of the Kirghis. After the Caspian, Aral, and Baikal, it is the largest lake in the Russian empire, being 150 miles long, with an extreme breadth of 75 miles, and is fed by numerous streams, of which the Ili is the most important. From November to April it is frozen. The waters are salt, and the fish few. Shipbuilding is carried on by the Russians at the mouths of the Ili, the Karatal, and the Lepsa.

Balkh (anc. Pers. *Bakhti*, 'the high town'; whence the classical Bactria), the capital of a principality of the same name in Afghan-Turkestan, 23 miles S. of the Oxus, and 6 miles N. of the hills. The ruins of the old town have a circumference of 20 miles, and are now almost entirely deserted. The new town, called *Takh-ta-pul*, founded by the Afghans as their capital, lies about 4 miles E., and has a pop. of 20,000, chiefly Afghan and Usbeg soldiers. B. rivals in historic interest Samarcand and Bokhara, having been the capital of a Græco-Bactrian and afterwards of a Buddhist kingdom, and its restoration is fondly expected. B. is known as *Am-ul-Belad*, 'the mother of cities.' Wherever irrigated the neighbouring country is prodigally fertile. The staple crop is wheat. See BACTRIA.

Ball, in military art, formerly a comprehensive name for all kinds of spherical projectiles discharged from firearms of any calibre, now only applied to a few peculiar illuminating or incendiary shells. The steady application of mechanical invention to the improvement of firearms has led to the adoption of elongated or cylindrical projectiles with elliptical or conical points, spoken of as Shot or Shell (q. v.), according as they are solid or hollow, in place of those of a spherical form. For the projectiles of portable firearms, see BULLET. The ground-light B. and Boxer's parachute-light B. are employed chiefly to illuminate the area occupied by the enemy, in order to discover his operations. The latter consists of a thin wrought-iron shell, enclosing two wrought-iron hemispheres, the lower carrying an inflammable composition, and the upper a calico parachute attached by chains to the lower hemisphere. The B. is fitted with a fuse timed to explode at its maximum elevation in the air. The explosion liberates the two hemispheres from their metal envelope, and the lower with the now ignited composition, being the heavier, falls more rapidly than the upper, causing the calico to open up; when this occurs, the whole apparatus slowly settles down over the area which it is designed to illuminate. The smoke B. is composed of a paper skin filled with combustible materials, which when ignited give off a dense and suffocating smoke, intended either to repel an enemy from mines, or to conceal the operations of the user.

Ball. As we may presume that every one knows what a B. is, we need not describe it. As an implement of amusement it is valuable alike to the infant and to the man. Many of the games played with balls are of great antiquity. The Greeks and the Romans were particularly fond of this mode of exercise. A favourite game in England two centuries ago was the French game of 'Pale Maille' (It. *palla*, Lat. *pila*; a ball; and Fr. *maille*, It. *maglia*, Lat. *malleus*, a mallet), in which the endeavour was, in as few strokes as possible, to strike with a mallet a B. through an arch of iron. This game used to be much played in the long alley near St James', London—hence the name

Pall Mall. In England, Cricket (q. v.) may be called the national game with a B., and in Scotland it is Golf (q. v.); but cricket is now much played in Scotland. Football (q. v.) is an amusement common to both countries, and, though a somewhat rough game, has greatly gained in popularity of late years. America has its particular game of Base-ball, which is played by nine persons, and resembles cricket in so far as one side bats and the other fields. It was first exhibited in England by two American 'teams' in 1874. See also POLO.

Ball, a dancing entertainment, whose nature is so generally understood that it would be superfluous to attempt any description of it. Perhaps the most charming amusement of this kind in England is the county ball: but all are popular, from the court ball of London to the subscription ball of the provinces. Fancy balls, to which those who go are expected to be in fancy or peculiar dress, are not now so common as they used to be; and masked balls or masquerades are, in England, entirely gone out of fashion. There have been one or two balls which, all undreamt of by those who gave them, have become renowned in history. There was, for instance, the Duchess of Richmond's famous gathering of beauty and chivalry at Brussels, when the 'sound of revelry by night' was suddenly hushed by the tidings that Napoleon had crossed the Sambre, quickly followed by the cannons' thunder on the field of Waterloo.

Ballachu'lish (Gael. *Baile-na-coolish*, 'the dwelling on the narrow strait'), a village and parish on the S. shore of Loch Leven, Argyshire, celebrated for its slate and marble quarries. About 10,000 tons of the blue roofing clay-slate are produced annually, the quarries employing some 200 men. Pop. of parish (1871), 944.

Ball'ad (Fr. *ballade*, It. *ballata*, a dancing song; Mid. Lat. *ballare*; comp. Gr. *ballizein*, to dance), a species of poetical composition, in which the matter is Epic (q. v.), or narrative, and the form is so far lyrical as being suitable to be chanted or sung, with or without musical accompaniment. The words *ballad* and *ball*, though now entirely distinct in meaning, are the same in derivation; and the earliest ballads, properly so called, of which there is authentic notice (though the practice of combining dancing with song was a function of the Greek chorus, and has been practised by most nations from the days of 'Miriam the prophetess, the sister of Aaron'), were the *ballistea* or 'songs accompanying dancing' of the Romans. In the *Life of the Emperor Aurelian* by Flv. Vopiscus, two specimens of these ballads are given as sung in honour of the emperor's great deeds in the Sarmatic war by a corps of boys 'skipping and dancing' (*Vopisc. Aurel.* 6). The praise of heroes continued to be the chief aim of ballad-writers; but, in the later developments of the B., the primitive, artless, and spontaneous accompaniment of dancing was superseded by the more artistic and stirring harp-accompaniments of the bards or minstrels whose office it was to sing the deeds of heroes in the palaces of their descendants, or to win a livelihood by reciting historical, pathetic, or humorous legends in verse in the castles of nobles. Ballads have been the natural medium for the transmission of national or individual history among all nations prior to the diffusion among these of learning and the arts. Mr Jamieson, in his *Illustrations of Modern Antiquities*, states in reference to the earliest ballads of which we have any knowledge, that 'the songs mentioned by Tacitus in his account of the Germans, those collected by the order of Charlemagne, and those which the Goths brought with them out of the East, are now not to be found; yet it is more than probable that much more of them is preserved (in however altered a form) than we are aware of, in the elder Northern and Teutonic romances, the Danish and Swedish, Scottish and English popular ballads, and those which are sung by old women and nurses, and hawked about in Germany.' The cultivation of B. poetry, and the patronage of the minstrels, who in many cases composed the ballads they recited, commenced in the countries of Europe at a very early period. Among our own Teutonic ancestors, and especially among all the Danish tribes, the office of the minstrel or Skald (q. v.) was held in the highest estimation, and the art of reciting or singing metrical romances to the accompaniment of a harp, the effect of which depended wholly on the skilful improvisation of the musician, rose, perhaps, to the highest eminence it ever attained. That the same art was simultaneously practised with much success in Britain

may be readily believed from the circumstance that when Alfred, the great English king, penetrated the Danish camp in 878 in the disguise of a minstrel, such was his skill in the estimation of his Danish hearers, whose competency to judge was undoubted, that he was introduced to perform before the king, and allowed to remain in the Danish camp as long as he pleased. To the effect of ballads in lighting the martial fires and fanning the patriotism of a country, no sterner testimony was ever given than in the edict of Edward I. to destroy the bards of Wales as a necessary preliminary to the conquest of that kingdom. The B. may be taken as the earliest form of poetical composition. It is probable that the two famous epics of Homer, and it is certain that those of the Spanish *Cid* and the German *Nibelungen* (see Carlyle's *Essays on German Literature*), had each its origin in a cycle of original ballads, which, moulded, connected, and extended, by one or by successive master-minstrels, assumed by a process of accretion and development the complete epic form in which they are now known to us. However ancient this kind of poetical production may be—and it doubtless dates from the time when mankind first began to live in communities and to recognise natural leaders—it was not known by the name of B. until, in the 12th c., the Italians applied that title to short, lyrical pieces, usually of the amorous sort. Since that period compositions of the B. class have been produced by every civilised nation, though the quality of these compositions has been unequal in different countries and at different epochs; for in France in the middle of the 17th c. the artificial and tasteless B. of the period had to be extinguished by the ridicule of Molière—a service which Gifford performed with equal effect for the vapid Della Cruscan (q. v.) at the close of the 18th c. In the S. of Europe, the B. has, perhaps, been most successfully cultivated in Spain. The *Spanish Ballads*, translated by J. G. Lockhart (1824), familiarised British readers with these. But the true home of the B. in its highest form is the N. of Europe. Among the most eminent modern writers in which the examples of the true B. may be found are, in German, Bürger, Schiller, Goethe, Uhland, and Heine; and in English, Scott, Coleridge, Longfellow, Poe, Browning, and Tennyson. In England, and still more in Scotland, the B. has received its richest and most various illustration. Of the English ballads, the *Lyttel Geste of Robin Hood*, *Cherry Chase*, *William of Cloudestley*, are among the best-known examples. But it was not until the appearance of Scott's *Minstrelsy of the Scottish Border* in 1802 that we were made familiar with the B. in its highest form. The Scottish ballads of *Tam Lane*, *Clerk Saunders*, *The Wife of Usher's Well*, *Helen of Kirkconnel Lea*, *Johnnie Armstrong*, *Edom o' Gordon*, &c., are unequalled in clear and vivid conception, truth, simplicity, and directness of expression, the profoundest pathos, and the charm of an art that knows not art, which place them at the head of the list of all compositions of the same class. See Percy's *Reliques of Ancient English Poetry* (1st ed. 1755; new ed. 3 vols. Lond. 1844); Motherwell's *Minstrelsy Ancient and Modern* (Glasg. 1827); Aytoun's *Ballads of Scotland* (2 vols. Edinb. 1858); Whitelaw's *Book of Scottish Ballads* (Glasg. 1845); Child's *English and Scottish Ballads* (Bost. U.S. 8 vols. 1857), &c.

Ballarat, a city and goldfield of the colony of Victoria, the former being 96½ miles W.N.W. of Melbourne. B. was the scene of one of the earliest gold discoveries in Victoria, in June 1851, and is still the principal gold-producing district of the colony. At the beginning of 1874 there were 11,388 miners in the district, employing plant of an aggregate of 9314 horse-power, and valued at £494,668. Quartz-mining is now the leading feature of the district, and auriferous reefs are remuneratively worked at a depth of 300 and 1000 feet. The town of B. consists of two distinct municipalities, B. East and B. West, with an aggregate pop. of (1871) 40,705. B. is a well-built city, containing many handsome edifices. The public buildings comprise a hospital, orphan and benevolent asylums, free public library, theatre, ten banks, and fifty-six churches, including a splendid Roman Catholic cathedral (1874). B. has also eight iron-foundries, thirteen breweries and distilleries, several flour-mills, and other factories. It is connected by railway with Melbourne, and communication will also be opened shortly between it and Ararat (56 miles) and Maryborough (45 miles). B. West is a see of the Anglican and Roman Catholic Churches.

Ballast, in engineering, is that portion of the permanent way of a railway immediately under and between the sleepers.

It usually consists of broken stone or gravel well beaten down and packed.

Ballast is the name given to any substance placed in the hold of a vessel when she is empty, or carrying only a partial cargo, in order to give her sufficient stability under sail. In ballasting a ship, both the quantity and the distribution of the B. has to be considered. If it is placed too high, it is apt to cause the ship to heel over too much under the action of the wind or water; if too low, she does not move freely enough, and is said to be *stiff*. The substances chiefly used as B. are iron, gravel, sand, and water. Of these, iron has the advantage that it has great specific gravity, and can be obtained in a form easily stowed. Water has the advantage that it does not require to be hoisted on board (as it can be admitted by merely opening a valve), and can be discharged without a crane (by a pump) at the same time that the vessel is receiving its load of cargo.

Ballater, a village in Aberdeenshire, on the Dee, 36 miles W.S.W. of Aberdeen, with a pop. (1871) of 691. It is noted for its chalybeate springs.

Balleny Islands, a group of five small volcanic islands lying in the Antarctic Ocean, lat. 66° 44' S., long. 163° 11' E., containing peaks some 12,000 feet high.

Ballot means literally a dance, but was first applied in modern Europe to the magnificent spectacles at the courts of Turin, Ferrara, France, &c., in the 16th c. and in the end of the 15th, in which symbolical scenes, dealing with various subject-matters, were represented by actors in dumb show, assisted by music and occasional dancing. In France the B. seems to have become a favourite *danserie* by the time of Charles IX. Baltagerini, musician to Catherine of Medicis, developed the B. *comique*: there were also the B. *historique* and *heroique*. Henry III. strongly encouraged such compositions, in which there was often no very definite dramatic meaning, the actors sometimes speaking, sometimes singing, but pantomime still prevailing, and appropriate music being played for the occasional dances. Baltagerini indeed said: 'J'ai toutefois donné le premier titre et honneur à la danse'; but in the following century, when Sully wrote music for the works of Molière and Quinault, the dance is in a subordinate position, a part of a pantomime *interlude*. (See *Ballet du Roi* or *Le Mariage Forcé*, danced by Louis XIV., 29th January 1664, vol. i. of Molière's collected works.) When the modern opera arose, the B. was retained, and in some cases, as in Glück's *Iphigenia in Tauris*, used successfully to increase dramatic effect. If *Macbeth* were ever made the subject of an opera, Lock's witches' dance would be an instance of an effective *opéra-ballet*. This, however, has tended to become little better than the modern *ballet-divertissement*, an *entre-chat* or *entr'acte* of mere dancing, unconnected with the rest of the performance, and often more remarkable for muscular dexterity than grace or decency. The true modern B., as a systematic expression of the drama, was revived by Noverre in the middle of the 18th c. He was called by Garrick 'the Shakespeare of dance'; and has left in his *Lettres sur les Arts Imitateurs* (Par. 1807) an account of his system. He treated such lofty subjects as *Hamlet* and *Medæa*, and succeeded in some cases in producing a coherent and intelligible effect. That human feeling has a large field of energetic expression in muscular movements is the fact on which the ancient 'orchestic' drama and M. Noverre both proceed; but there are well-defined limits to the range of such expression, and these limits vary extensively in different nations. A *Conservatoire de B.* (training-school) is still regarded as a necessary part of the modern opera-house.

Ballina (Gael. originally *Bel-ath-an-sheadha*, pron. *Bella-hani*, 'the ford-mouth of the wood'), a seaport in county Mayo, Ireland, on the Moy, five miles from its entrance into Killala Bay. It has an active trade in flax, cured provisions, and salmon, but the river is only navigable to within a mile and a half of the town. In 1798 the French landed here and took B., but were defeated at Killala. B. includes the suburb of Ardnarea (*Ard-na-riaghadh*, 'the hill of execution'), which lies on the right bank of the river, within Sligo county. Pop. (1871) 4307, of whom 3644 are Roman Catholics.

Ballinasloe (Gael. originally *Bel-atha-na-shaightheadh*, pron. *Bellanaslooa*, 'the ford-mouth of the hosts'), a thriving town of Ireland, on both banks of the Suck, in Galway and Roscommon

counties, 81 miles W. of Dublin, on the Dublin and Galway Railway. It is the headquarters of the Galway constabulary, the seat of a poor-law union, and is noted for its October wool and cattle fair, which is one of the largest in Ireland, and to which there may be some allusion in the name of the place. Pop. (1871) 5052, of whom 4307 are Roman Catholics.

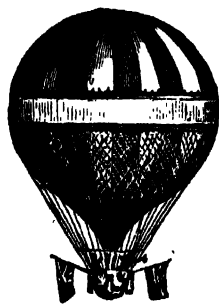
Ballinrobe (originally *Baile-an-Rodhba*, pron. *Rôba*, 'the town on the Robe'), a town in county Mayo, Ireland, on the Robe, 3 miles E. of its entrance into Lough Mask, and 15 S.S.E. of Castlebar. It is the seat of the general sessions, contains a barrack, and has two annual fairs. Pop. (1871) 2048, of whom 2172 are Roman Catholics.

Balliol College, Oxford, founded between 1263 and 1268 by John de Balliol, and enriched in 1340 by Sir William Fenton and Sir Philip Somervyle, has since had numerous benefactors, among others, John Snell, in 1677. The Snell Exhibitions, at present fourteen in number, and tenable each for five years, in the gift of the University of Glasgow, attract annually to B. C. the best Latinists among Scottish students. Adam Smith and Sir William Hamilton were Snell Exhibitioners. The college has the presentation to nineteen livings. The society in 1875 consisted of a master, thirteen fellows, and twenty-four scholars, including three mathematical scholars; the number of undergraduates was 179, and of members on the books, 543.

Ballistic Pendulum, an instrument invented by Robins towards the close of the 18th c. for the purpose of measuring the velocity of cannon-balls and musket-balls. The pendulum consists of a rigid rod, to the lower end of which is attached a large cubical piece of woodwork, at which the shot is aimed. The momentum of the bullet at the moment of concussion is imparted to the whole apparatus; and, from the angle through which the pendulum moves, the velocity of the bullet is easily calculable.

Ball'ium. See **BAILEY**.

Balloon (Fr. *ballon*, a large ball), consists essentially of a globular or pear-shaped integument, filled with a gas specifically lighter than air. Its object is to render possible aerial navigation; and its buoyancy depends upon the principle of Archimedes (q. v.), that a body will sink or rise in a fluid of varying density until it reaches a point at which the fluid is, bulk for bulk, of the same weight as the body. The B., as at present employed and fitted up, consists of a pear-shaped bag of silk, coated with a layer of varnish, in order to render it air-tight. A car is attached by cords to a net which covers the whole of the upper hemisphere, and sometimes extends even as far as the mouth or neck of the B. By this means the weight of the car and its occupants is distributed as uniformly as possible. Another most important apparatus is the valve, which consists of a wooden clapper fitting over an aperture in the upper surface of the B., and which is regulated by means of a rope hanging down into the interior of the car.



Balloon.

The first B. capable of sustaining any considerable weight was invented by the brothers Montgolfier, papermakers at Annonay, in France, towards the close of last century. The envelope was of paper, and was filled with heated air. After the success of June 1783, when a spherical B. of packcloth, covered with paper, and 35 feet in diameter, rose to a height of 1500 feet in the presence of a large concourse of people, at a place near Annonay, the Academy of Science appointed a committee to report upon the experiment. A few weeks later, Professor Charles, assisted by the brothers Robert of Paris, managed to fill a B., 12 feet in diameter, with hydrogen gas. The first persons who ventured to ascend in a free B. were the Marquis d'Arlandes and M. Pilâtre de Rozier, and this feat they performed at the Château de la Muette, near Passy, November 21, 1783, in a Montgolfière or fire-B., remaining aloft about twenty-five minutes. On December 1st of the same year, MM. Charles and Robert ascended in a hydrogen B., and after coming down, M. Charles reascended to a height of nearly two miles. After this,

numerous ascents were made by such men as Blanchard, Morveau, Lunardi, Jeffries, Romain, who was killed with M. de Rozier in 1785, at the very commencement of their projected journey across the Channel. In 1802, General Money narrowly escaped drowning; and in the same year Garnerin descended successfully from a B. by means of a parachute. On the 23d of August 1804, Gay-Lussac and Biot ascended to a height of 13,000 feet; and on the 15th of September, Gay-Lussac by himself reached an elevation of 22,977 feet. Hitherto hydrogen or heated air had been employed as the means for rendering balloons buoyant, but these have given place to coal-gas, which was first introduced by Mr Green. The longest journeys hitherto undertaken are the remarkable voyage of Messrs Green, Holland, and Mason, on November 7, 1836, from London to Nassau, a distance of 500 miles in 18 hours, and the still more remarkable one of the American aeronauts, Wise and La Mountain, who travelled 1150 miles in less than 20 hours.

The most celebrated of recent aeronauts is Mr Glaisher, who, on September 5, 1862, accompanied by Mr Coxwell, rose to a height of about seven miles, on which occasion he became insensible; and Mr Coxwell, having lost the power of his arms, opened the valve by pulling the rope with his teeth. Of late years, balloons have been used for strategic purposes, notably in the recent Franco-Prussian war of 1870-71. M. Gambetta escaped in one from Paris, when the city was surrounded by the Germans, and organised a further resistance of the French on the banks of the Loire; but the best services which they can render are in the interests of physical science. M. Tissandier, a Frenchman, has recently made some important meteorological observations in the higher strata of the atmosphere. In one of his most recent ascents (1875), such a height was obtained that the three occupants of the car became insensible; and when he himself regained consciousness, he found both of his companions dead, owing to the bursting of blood-vessels. Numerous but futile attempts have been made to devise some method of steering, so as not to be dependent upon the direction of the wind; and in 1872 Professor Helmholtz of Berlin gave it as his opinion that a B. could be steered if only moving at a slow rate through the air. See *Travels in the Air*, by Glaisher, Flammarion, Fonvielle, and Tissandier (Lond. 1870).

Ball'ot (Fr. *ballotte*, 'a little ball'), a mode of secret voting by means of little balls of different colours, but sometimes by tickets having some mark of assent or dissent appended to the name of the candidate. Whether secret voting be desirable is clearly a matter of expediency; for what may be expedient in the case of voting for persons wishing admission into private societies, may not be so as regards aspirants for public offices. What may be proper in the former case to preserve social harmony, may be cowardice and a public danger in the latter. In ancient Athens voting was generally by show of hands, but the B. was resorted to where secrecy was desirable, as in judicial proceedings and in the court of Areopagus. At Rome the B., confined at first to the enactment or to the repeal of laws, was by the *Lex Gabinia* (B.C. 139) employed in the election of magistrates. At Venice the B. is said to have operated beneficially. In France and America, and generally in new countries, as Australia, magisterial elections are made in this way. Secret voting in legislative assemblies, introduced into the French Chamber of Deputies in 1840, was abolished in 1845, having been found productive of abuses. The election of Louis Napoleon, first as president (1848), then as emperor (1852), and again the Plebiscite (q. v.) of approval of his policy (1870), by means of the B., are among the most striking examples of secret voting on record, and gave occasion to the adversaries of the general principle to maintain that, in the hands of a well-organised despotism, the B. was a most efficacious instrument of tyranny. No question has been more keenly discussed by politicians than the B.; one party maintaining that it was essential to the interests of electors and candidates alike, as it would annihilate the influence of threats, and remove the inducements to bribery; while the other, regarding the franchise as a trust, maintained the duty of open voting, as necessary to preserve in the voter a due sense of his responsibility to the community. The value of the B. also, in its operation in other countries, was represented in different aspects, according to the politics and prejudices of the advocates. But much of the interest attaching to the question in Britain has disappeared since the passing of the *Ballot Act*,

35 and 36 Vict. cap. 32, 18th July 1872, under which both municipal and parliamentary elections are now conducted.

Ball'ot for Militia. See MILITIA.

Ballo'ta. See HOREHOUND.

Balls, Hollow, are projectiles used in military operations for the purpose of giving light, producing a dense smoke, or emitting an intolerable odour. There are accordingly three kinds of such projectiles, known as light, smoke, and stink B., and the respective effects are produced by the ignition of the combustible material composing the ball.

Ball'y, or Bal, properly **Baile**, a Gaelic word signifying originally a place, a home, then a fort or town, and allied to the Greek *polis*. It is frequently prefixed to names of places in Ireland and Scotland, e.g., Ballyshannon, Ballymena, Ballintrae or Ballantrae, Ballycastle, Balmoral, Ballachulish. See Blackie's *Etymological Geography* (Lond. 1875), and Joyce's *Irish Names and Places* (Dub. 1869, 2d ser. 1875).

Ballycas'tle ('the town of the castle'), a seaport of Antrim county, Ireland, lies picturesquely on a fine bay, at the base of Knocklaid Mountain, 88 miles N. of Belfast. It is divided into an upper and lower town, standing a quarter of a mile apart, and has considerable linen manufacture and salmon-fishery. The erection of the harbour, which is now filled with sand, and of a fine pier, cost £15,000. Near B. is the 'Grey Man's Path,' a remarkable opening in the face of a greenstone cliff. Pop. (1871) 2102. The B. of Mayo is a somewhat different name. It was originally *Baile-an-Chaisil*, the town of the cashel, or circular stone fort; but the Irish cashel is probably connected with the Lat. *castellum*.

Ballyme'na (originally *Baile-meadhonach*, 'middle town'), a town in the heart of Antrim county, Ireland, on the Braid, 18 miles N.W. of Belfast, with which it is connected by railway. It is one of the largest Irish markets for linen and flax, and its chief industry is bleaching. Pop. (1871) 7931, of whom 6197 are Protestants.

Ballyshann'on (originally *Bel-atha-Seanaigh*, pronounced *Bellashanny*, 'the mouth of Seanach's ford'), a seaport in the S.W. of Donegal county, Ireland, stands at the entrance of the river Erne into Donegal Bay, 26 miles N.W. of Enniskillen. It has a valuable salmon-fishery on the Erne, which is here crossed by a bridge of fourteen arches. Next to the Shannon, this river is the most voluminous in Ireland, but a bar at its mouth has hindered the trade of the town. B. is the headquarters of the county militia. Pop. (1871) 2958, of whom 2372 are Roman Catholics.

Balm of Gilead. See BALSAM.

Balmoral Castle, in Braemar, Aberdeenshire, 48 miles W. of Aberdeen, a residence of Queen Victoria, was built by the Prince-Consort, who purchased the estate in 1852 from the Earl of Fife. The castle, which is in the Scottish baronial style of architecture, is built of granite, and has a square tower 80 feet high. There is an extensive deer-forest, comprising 30,000 acres, belonging to the estate. The name B. signifies in Gael. 'the majestic dwelling.'

Balnaves', Henry, of Halhill, born at Kirkcaldy, Fifeshire, in the reign of James V. He was educated at St Andrews and at Cologne, where he adopted the principles of the Reformation, and on his return to Scotland studied law. In 1583 James V. made him a senator of his new College of Justice, and under the regency of Arran he was appointed Secretary of State, but was imprisoned in 1543 on account of his Protestantism. On the capture of the castle of St Andrews, in which he had taken refuge in 1547, he was, along with Knox, sent to France as a prisoner of war. Returning to Scotland in 1554, he was appointed one of the commissioners who in 1559-60 concluded the treaty of Berwick, which established the Reformation in Scotland, and was one of the commission appointed to revise *The Book of Discipline*. B. died in 1579.

Ballot'ra, a town in the state of Jodpore, or Marwar, Rajputana, Hindostan, is situated on the river Luni, to the W. of the Aravulli mountains, 49 miles S.W. of the city of Jodpore. Pop. 7275.

Bal'sam. This term is applied to many varieties of oleo-resinous exudations, commonly procured by incising the stem and branches of plants. When fresh, they are liquid or semi-

liquid, glutinous, aromatic, and acrid to taste; by exposure to the air, they gradually thicken, and ultimately become solid, darker in colour, and in some cases odourless. They are mixtures of resins and volatile oils; some of them, however, contain cinnamic or benzoic acid in addition, and advantage is taken of this circumstance to divide them into two groups—(1) those of purely oleo-resinous character; and (2) those in which cinnamic or benzoic acid is present together with volatile oils and resins. The first group embraces Copaiba B., Mecca B., Canada B., and other Turpentine (q. v.) of coniferous plants; and to the second group belong the balsams of Peru and Tolu, liquidambar, and storax. They dissolve in alcohol, and yield volatile oils on distillation with water.

Canada Balsam is procured from the Balm of Gilead fir, *Abies balsamea*, which grows in Canada and the United States. It is transparent, colourless, or slightly yellow, mobile, with an acrid penetrating taste and agreeable odour. It hardens in thin layers, retaining its transparency, and is employed for mounting microscopical objects, and is valued as a cement for optical instruments on account of its refractive power being nearly the same as that of crown glass.

Copaiba or Copaiva Balsam is abundantly yielded by several S. American species of *Copaifera* (*Leguminosæ*). Of the three different varieties of this B., the Brazilian is the most common. It is a light-yellow transparent liquid, possessing a peculiar aromatic odour, and a nauseous hot taste. It is used in the preparation of lac varnishes and of tracing paper; also in medicine in arresting discharges from the mucous membrane of the urethra. An unsophisticated variety of copaiba B. was a few years ago introduced into this country from the Brazils. It possesses greater mobility and more essential oil than the ordinary B., and resists a certain chemical reaction which had hitherto been regarded as positive evidence of the freedom of copaiba B. from adulteration.

Mecca Balsam, Opobalsamum, or Balm of Gilead, is said to exude from a tree of the genus *Balsamodendron*, growing in Arabia, and is also obtained by boiling the branches in water. The finest kind is extremely fragrant, and is highly esteemed by Asiatics; but it is scarce, and little of it reaches the British market.

Peru Balsam.—Three varieties are known, the produce of *Myrospermum Myroxylon Pereira*, growing sparsely in Central America, and chiefly imported into Great Britain from the B. coast of San Salvador. The *white* kind is extracted from the fruit, and when hardened by exposure becomes the *dry* Peru B. Both of these varieties are scarce. The *black* viscid variety is common in commerce, and is obtained by bruising the stems of the plants. It has an acrid bitter taste and agreeable odour, and is employed medically as an expectorant and for external application, and as a substitute for vanilla in confections and perfumery.

Tolu Balsam closely resembles the commercial Peru B., and is obtained in large quantities by incision of the stem of *Myrospermum toluiferum*, which grows on the banks of the Magdalena and other localities in Colombia. When fresh, it is soft, yellowish, translucent, has a lemon-like odour and a sweetish irritating taste; by keeping, it changes to a thick consistence of a dark-red colour, and ultimately to a dry friable condition. It is used in perfumery, and medicinally as an expectorant. Tolu lozenges, valued for troublesome coughs, owe their efficacy to the presence of this B.

Storax Balsam, the produce of a shrub, *Styrax officinale*, growing in Syria, Greece, &c., was formerly imported into Great Britain chiefly from Asiatic Turkey, in the form of reeds enveloped in leaves, *Styrax calamita*, and in compact masses with white tears, hence *Amygdaloid styrax*. It is now extremely rare, and the liquid and solid varieties of the druggist are frequently factitious compounds, of very variable composition and character.

Liquidambar Balsam is found in considerable abundance between the bark and the wood of *Liquidambar styraciflua*, which is common in Louisiana, Florida, Mexico, &c. It exudes through cracks in the bark as a clear slightly yellowish liquid, possessing a very fragrant odour. An inferior kind is procured by boiling the small branches and leaves, and skimming off the balsamic oil as it rises to the surface of the water. In France it is employed as a perfuming agent.

Under the name of *Artificial Balsams* is grouped a diversity of pharmaceutical preparations, of varied character and constitution, principally used externally.

Balsamina'ceæ, a natural order of dicotyledonous plants, including only two genera, and about 130 species. Many of them have showy flowers, but their properties are unimportant. They are herbaceous, succulent plants, chiefly found in the E. Indies. Their seed-vessels, when ripe, usually open with considerable force, and scatter the seed. *Impatiens balsamina*, the common garden balsam, and *Impatiens noli-tangere*, or Touch-me-not, a native of Britain, belong to this order.



Balsam.

Balsamoden'dron, a genus of dicotyledonous shrubby plants, belonging to the order *Amyridaceæ*. They are mostly furnished with spines, and have little foliage. They yield a fragrant balsamic substance, such as balsam or balm of Gilead, myrrh, bdellium, and elemi.

Bal'sam of Sulphur, an ointment composed of two parts of sulphur to eight of olive oil. In Germany it is made by adding one part of sulphur to three of turpentine. It is used as an application to foul ulcers.

Bal'ta, a prosperous town on the Kodima, a tributary of the Bug, government of Podolia, European Russia. Pop. (1867) 14,528.

Balt'ic Provinces (Russia), comprise the governments of Courland, Livonia, Esthonia, Petersburg, and the Grand Duchy of Finland. Area about 200,000 sq. miles; pop. (1867) 4,903,808. Courland once belonged to Poland, the others to Sweden. Their constitutions vary much, but are being gradually shaped after the Russian model. In enumerating the B. P. the last two are sometimes omitted. Baltic-Port is the name of the haven (pop. 466) in Esthonia, 25 E. of Revel, which forms the terminus of the St Petersburg Railway.

Balt'ic Sea (Ger. *Ost See*, or East Sea), a large inland sea, bordered by Denmark, Germany, Russia, and Sweden, separating central from northern Europe, and communicating with the N. Sea by the Sound and the Great and Little Belts. Its length is 900 miles, breadth 138 miles, area 156,612 sq. miles. It is throughout shallow, the average depth being from fifteen to twenty fathoms, which, combined with the sudden changes of the wind, makes sailing dangerous. The water is of a lower temperature than that of the ocean; is comparatively fresh, owing to the large influx of river-water, and to the small evaporation to which it is subjected; and the tides are scarcely noticeable. The navigation is stopped from three to five months annually by ice. Branching off from it are the Gulf of Bothnia on the N., between Sweden and Finland; the Gulf of Finland, between Finland and Esthonia; the Gulf of Riga, between Livonia and Courland, &c. More than 250 rivers run into the B. It contains numerous islands, the principal of which are Zealand, Funen, and Laaland (Danish); Gottland and Oland (Swedish); the Aland, Dagö, and Oesel (Russian); and Rügen (Prussian). There is a large commerce, the chief exports being timber, hides, tallow, and grain. The coast in the S. is flat and sandy; in the N. it is for the most part rocky and precipitous, but there are many important harbours, as Copenhagen, Kiel, Danzig, Memel, Riga, Cronstadt, and Stockholm, and trade is further facilitated by the Slesvig-Holstein Canal, near Kiel, connecting the B. with the N. Sea. There is said to be a gradual vertical subsidence of the coasts in the S. of Sweden, and further N. a gradual uprising, at the rate of three feet in a century.

Bal'timore, a city and port of entry in Maryland, U.S., on the Patapsco river, 12 miles from the Chesapeake Bay, 178 from the Atlantic, 37 from Washington, and 98 from Philadelphia by railway. The site is undulating and picturesque. The harbour is little more than 20 feet deep, but is safe and commodious. The chief articles of trade are fruits, grain, tobacco, coal, and oysters. In 1874 the vessels, native and foreign, entering from foreign ports were 1117, tonnage 558,599; clearing port, 1026 vessels, tonnage 524,847. B. is the see of the Roman Catholic primate of the United States, and has a granite cathedral, with a lofty dome, some fine paintings, gifts of the kings of

France; a new city-hall of white marble, built at a cost of three million dollars; the custom-house with a dome 115 feet high; the Peabody Institute, which received one million dollars from George Peabody, and has a library of 60,000 vols.; and the munificent Hopkins' Hospital, begun in 1873. B. was founded in 1729, and is now reputed to be the third trading city in the U.S. It is healthy, with a fine climate and sky, and is famed for the beauty of its women. It is the seat of the Maryland University, and has an excellent public school system. In the vicinity is Druid Hill Park, of 704 acres, with many noble trees. Besides shipbuilding and oyster and fruit packing, B. has manufactures of iron, machinery, leather, clothing, &c. The city is supplied with water from Jones's Fall and Gunpowder River, and its reservoirs can store 857 millions of gallons. It has a monument to General Washington, and one to the memory of those who fell in the battle of B., 1814, hence it is popularly called the 'Monumental City.' It derives its name from Cecil Calvert, second Lord Baltimore. The original B. is a small village near Skibereen, Ireland. Pop. (1870) 267,354, of whom about one-third are Germans.

Baltimore Bird, or Oriole (*Yphantès* or *Icterus Baltimore*) a genus of Perching or Insectorial birds, belonging to the Dendrostraf section of that order, and found throughout the United States. Its northernmost limit appears to be about the 55° of N. latitude. It has a straight, acute bill, a long wedge-shaped tail, and pointed wings. Its plumage is bright orange and black, and it has received the names of golden robin and 'fire-bird,' from its brilliant hues. It builds a pouch-like nest, composed of hemp and flaxen strands deftly interwoven, and suspended from a forked branch.



Baltimore Bird.

Baltistân', or Little Tibet, once an independent state, now a province of Cashmere, on the Upper Indus, is separated from Chinese-Turkestan by a range of mountains. Its inhabitants are of Tibetan origin, but profess Mohammedanism. Their number is unknown. The capital, Iskardo, or Skardo, is composed of about 150 half-ruined houses.

Baltschik', or Baldjik, a town of European Turkey, vilayet of the Danube, on the Black Sea, 18 miles N.E. of Varna, with the safest harbour on the Black Sea, and a considerable trade. Its yearly market for horses, cattle, and sheep is important. From B. and Varna the Franco-English army sailed for the Crimea in September 1854. Pop. 4000. Near it are the ruins of Tomi, to which Ovid was banished.

Baluster (corruptly *bannister*; from the Ital. *balaustro*, through the Fr. *balustre*), a small column used in railings called balustrades, which may be either employed as an ornament, or for protection on the ledges of stairs, balconies, outside of windows, or in arcades. The B. varies in form and proportions according to the purpose to which the balustrade may be devoted. The shaft is generally belly-shaped, and sometimes double belly-shaped, and the section, though generally round, is sometimes quadrangular.

Bal'ustrade, an ornamental railing or parapet, composed of a series of balusters, surmounted by a coping. Statuary figures are frequently placed at short interval on balustrades.

Bal'zac, Jean Louis Guez de, a celebrated French *littérateur*, who contributed much to refine his native language, though, singular to say, he was equally destitute of genius and taste. He was born at Angoulême in 1794, and acquired the favour of Rich-



Balustrade.

Beau, who even flattered him. When his first work appeared in 1624, it was received at first with universal applause; but gradually a suspicion arose in the minds of some that the grandiose style of B. concealed a paucity of ideas and a puerility of taste. His critics became his enemies. One of them, Le Père Goulu, in a violent diatribe entitled *Phyllarque*, passed from animadversion to calumny. At last B., wearied of controversy, retired to his ancestral estate on the banks of the Charente, where he wrote most of his works, corresponded with kings, and died 18th February 1655. Among his once famous writings are, *Aristippe*, *Lettres Choisies*, *Lettres Familiales à Chapelain*, *Le Socrate Chrétien*, *Pensées de B.* See *Œuvres Choisies de B.*, by Malitourne (Par. 1823).

Balzac, Honoré de, a distinguished French novelist, born at Tours, 20th May 1799, commenced his studies at the college of Vendôme, and completed them at the *pension* Lepitre, Paris. He was then placed in the office of a notary, but devoting himself to literature, he had published numerous volumes under various names, among others, that of *R'hoone*, an anagram of Honoré, but with no success, before he became, in 1826, the partner of the printer Barbier. He was still unsuccessful; but, though burdened with debt, he persevered heroically, till, in 1829, *Le Dernier Chouan*, to which he put his own name, secured for him public recognition. Some of his best-known works are *Physiologie du Mariage* (2 vols. Par. 1831); *Scènes de la Vie privée* (5 vols. 1831); *Scènes de la Vie de Province* (1832); *Scènes de la Vie parisienne* (1832); *Le Médecin de Campagne* (1835). The publication of this last led to a correspondence between B. and the Countess de Hanska, whom he subsequently married. He was cut off by hypertrophy of the heart, 20th August 1850, and Victor Hugo pronounced an eloquent *éloge* over his grave. *L'Histoire intellectuelle de Louis Lambert* and *Eugénie Grandet* are the most artistically complete of his works, which, though full of interest, especially for females, are overstrained, somewhat pretentious in their analysis, and not altogether so philosophical as their imaginative author supposed. A collected edition of his works appeared under the title *La Comédie Humaine* (45 vols. Par. 1856-59). See Sainte-Beuve, *Portraits Contemporains* (vol. ii.), and Gustave Desnoiresterres, *Vie de Honoré de Balzac* (1851).

Bambarr'a, a native state of Sudan, W. Africa, bounded S. by Guinea, N. by the Sahara, W. by Senegambia, and extending E. it is supposed, to the 15th meridian. It is partly mountainous, with a hot but not unhealthy climate, and is intersected by the Niger, on whose banks are the chief towns, Sego, Bam-maku, Yamina, and Sansanding, the first of which is the capital. The rainy season is from June to November. In many parts the land yields yearly double crops of corn, rice, maize, and yams. The cotton-tree, oil-palm, date, and butter-tree are indigenous. The chief wild animals are the lion, the leopard, the elephant, and the panther; there is also a good supply of domestic animals, including excellent horses. The inhabitants, reckoned at 2,000,000, are chiefly Mandingoes, and are a warlike race, partly pagan, and partly Mohammedan. They were governed by a king of their own till 1861, when El-Hadj Omar, known by his struggles with the French in Senegal, made himself master of the country. See Vignon's *Le Royaume de Ségou et les Bambaras* in *Nouv. Annales des Voyages* (1857).

Bam'berg, a city of Bavaria, circle of Upper Franconia, on both sides of the Regnitz, near its confluence with the Main. Pop. 25,738 (1871). It is the seat of an archbishop. The most remarkable of its public structures is the cathedral, in the Byzantine style, founded by the Emperor Heinrich II. in 1002 (restored since 1827), and containing the monuments of the founder, and of Kunigunde, his wife. The library contains 60,000 volumes, and there are several scientific collections of great value. See Jäck's *Beschreibung der Bibliothek zu B.* (Nürnberg. 1831-34). The educational institutions are numerous and excellent. B. has cotton mills and breweries. Horticulture is carried on extensively, and there is a large export trade in garden-seeds. On an eminence not far from B. are the ruins of the castle of Altenburg, originally the seat of the ancient Counts of Babenberg. See Jäck's *Geschichte B.* (4 vols. 1806-9).

Bambi'no, the figure of the child-Christ in swaddling clothes, frequently seen in Roman Catholic altar-pieces. A splendid specimen is to be seen at the Ara Cœli (Rome), to which many make pilgrimages at Epiphany.

Bambocciades (Ital. *bamboccio*, a diminutive of *bamba*, meaning simple or stupid), the name given by Italians to paintings in which subjects from common life, such as penny-weddings and fairs, are treated grotesquely. They are named after the Dutch painter, Pieter van Laar, whom the Italians called *Bamboccio* on account of his simple and childish character. He was not the first painter of such, but he was the first to make them popular in Italy.

Bamboo, the popular name of a genus (*Bambusa*) of plants which belong to the natural order *Graminaceæ* or the Grasses, but which differ very much in appearance from the ordinary grasses of temperate climates. The bamboos attain the dimensions and appearance of trees, some of them growing to a height of 100 feet. The stems are woody, hollow, and jointed, and from the joints they shoot out numerous lateral branches. They are natives of all tropical parts of both the Old and New World, and are among the most useful of plants in the lands of their growth. The grains of *Bambusa arundinacea* and other species are like oats in appearance, and are used as food, and the tender young shoots are occasionally picked for table use. The stems of species which attain considerable diameter are used as timber in the construction of houses, for the masts and spars of vessels, and general purposes. Sections of them are used as water vessels, the septum of a joint forming the bottom, and part of the neighbouring joint being left as a handle, or when both joints are left entire, a barrel is formed. The smaller stems are used for an endless variety of purposes. Cut into proper lengths, and with the septa bored out, they form admirable telescopic fishing-rods. They are extensively used throughout the world for walking-sticks and umbrella-stalks, and the Chinese form out of lengths of one joint useful pencases or manuscript holders. Excellent, light, and durable chairs, and other articles of furniture, are made from bamboos, the frames being made of whole pieces overlaced with basket-work of strips of the same material, and the Chinese and Japanese excel in the manufacture of B. baskets. A sticeous concretion termed *tabasheer*, possessed of peculiar optical properties, and highly valued as medicine in the East, is formed in some species of oriental bamboos.

Bambouk, a hilly country of Senegambia, W. Africa, bounded on the N. by the Senegal, and extending from lat. 12° 30' to 14° N., and long. 10° to 12° 30' W. It is chiefly noted for its gold-mines, but its valleys are exceedingly fertile. The inhabitants are a savage race of Mandingoes, who are mostly pagans. Since 1857 the land has been much devastated by the 'holy war' carried on by the zealous Mohammedan El-Hadj Omar, so that both the gold-mining and the trade in ivory have seriously fallen off. B. abounds in almost all the wild animals of Africa, and its climate is unhealthy. Mungo Park and Major Houghton contributed much to our knowledge of B. in the early part of the century, and, latterly, the French. See Raffeneil, *Voyage dans l'Afrique Occidentale* (Par. 1846), and Pascal in the *Revue Algérienne et Coloniale* (Aug. 1860).

Bam'brough, or **Bam'borough** (originally *Bebbanburh*, 'the town or port of Bebbe,' the wife of the Bernician king, Ida), an ancient castle on the coast of Northumberland, perched on a perpendicular rock 150 feet above the sea-level, and accessible only on the S.E. side. B. was a fortress in the days of Penda (7th c.), the heathen king of Mercia, whose attempt to storm it was frustrated (says Bede) by the prayers of St Aidan. It passed to the crown in 1095, when the wife of the great Earl Mowbray was forced to surrender it to save her husband's life. In the 15th c. it again became private property. The castle and manor, forfeited by Thomas Forster in 1715, were purchased by Lord Crewe, Bishop of Durham, who had married Forster's niece. He bequeathed them, at his death in 1721, for charitable purposes. The charity has been since much increased, and in 1874 amounted to about £10,000 a year, devoted to various humane



B. bambusa Nigra.

purposes, such as keeping up lifeboats; maintaining signals to warn vessels in thick and stormy weather from the dangerous cluster of rocks known as the Farn Islands; dispensing medicine and advice to the poor gratis; educating and clothing poor children, &c. B. village, near the castle, was once a royal burgh.

Bambu'sa. See BAMBOO.

Bam'ian Valley, the only practicable pass for artillery over the Hindu Kush from Cabul to Turkestan, is 8496 feet in height. Besides being strategically important, the B. V. is remarkable for the colossal statues and ancient monuments it contains. Ghulghula, a hill in the valley, 35 miles N.W. of Cabul, is carved so as to form statues in alto-relievo of a male and female figure, the former 160 and the latter 140 feet high. In the interior of each of these great statues is a stair winding upwards to the head of the figure. In the hill also a series of cells, ranged in irregular tiers and covered with carving, have been excavated. The ruins of tombs, mosques, and buildings, at an early period consecrated to the Buddhist religion, which is supposed to have had one of its chief centres in the B. V., abound in the vicinity.

Bamp'ton ('tree-town,' the first part of the word being the Eng. *beam*, comp. Ger. *baum*), in the N.E. of Devonshire, 22 miles N. of Exeter, has manufactures of serge and of pottery, and valuable limestone quarries. Pop. (1871) 1111.

Bampton-in-the-Bush, a village in Oxfordshire, with a pop. (1871) of 764. There is here an old cruciform church with a Norman tower. As a specimen of pointed Gothic it is almost unique.

Bampton Lectures, founded by the Rev. John Bampton, Canon of Salisbury. These lectures, eight in number, are delivered annually at Great St Mary's, Oxford, the foundation being vested in the University of Oxford. The subjects of the lectures are mainly connected with the Christian evidences, and the preacher must be an M.A. of Oxford or Cambridge. From 1780, when the first course was delivered, up till the present time, there has been no interruption of the annual delivery, with the exception of the years 1834, 1835, and 1841. Some of the series have excited much attention, and caused much controversy. Dr White's lectures on Christianity and Mohammedanism, delivered in 1784, were said to owe much of their value to the assistance of Dr Parr and Dr Badcock (De Quincey's *Essay on Dr Parr*, vol. v. of his works, Edinb. 1863). Among the lecturers have been Heber (1815); Whately (1822); Millman (1827); and Dr Hampden (1832). Dr Hampden's lectures, of which the subject was *The Scholastic Philosophy considered in its Relation to Christian Theology*, were attacked by the Oxford Tractarians, and the author charged with Rationalism and Socinianism. Great but unavailing opposition was made to his appointment as Regius Professor of Divinity in 1836; and on his elevation to the see of Hereford in 1847, thirteen bishops protested against the appointment. Mansel's series on *The Limits of Religious Thought*, delivered in 1858, gave rise to much interesting discussion; and so did Rawlinson's *Historical Evidences of the Truth of the Scripture Records Stated Anew* (1859). Canon Liddon's lectures on our Lord's divinity (1866) form a valuable contribution to theological literature. The lecturer for 1875 was the Rev. William Jackson, M.A., of Worcester College. The original endowment, £120, now produces £200, and the lectures are published at the expense of the estate, within two months of their delivery.

Bampu'ra, or Bawampura, a town of India, in the native state of Holkar, 170 miles E.S.E. of Baroda. Its palace and fort were begun by Jeswant Row Holkar, whose fine marble statue adorns the former. Pop. about 10,000.

Ban, or Banus (a Slavonic word signifying 'lord'), was the name originally applied to the governors who were appointed to districts on the S. and E. frontiers of Hungary for purposes of national defence, and was therefore equivalent to the *Markgraf* or Border Earl of the old German empire. The government of the Bans was really military, a regular civil establishment being impossible during the Turkish wars. The districts were consolidated towards the end of the 16th c., the Sultan Selim undertaking to recognise the imperial power in Dalmatia, Croatia, and Slavonia, in consideration of the recognition by the Emperor of the Turkish *vaiwodes* in Transylvania, Moldavia, and Wallachia. The B. of Croatia and Dalmatia speedily became an important figure in Hungarian history,

race-jealousy sometimes inclining him to adopt the imperial against the national cause. In 1723 the B. became directly subordinate to the Hungarian palatine, holding a place in the council, while the territories were represented in the national diet. In 1849, on the erection of the vassal lands into crown-lands, the B. ceased to have political connection with Hungary. Zriny and Erdody in the 17th c., and Jellachich in the 19th, are among the best-known of the Bans. In the insurrection of the Herzegovina (1875), the B. appears in the Dalmatian Assembly as the mere mouthpiece of the imperial cabinet.

Bana'na, a tall herbaceous endogen belonging to the natural order *Musaceæ*, which, amid the luxuriant vegetation of tropical countries, is much admired for its elegance and the beauty of its flowers and foliage. The *Musa sapientum* of botanists, it is now generally considered to be only a variety of the Plantain (q. v.). Both of these trees administer in many ways to the comfort of the natives of hot climates, but chiefly from the abundant nutriment afforded by their fruits, which are produced in enormous quantities. The B. fruit is from four to eight inches long, and of a pale yellow colour; before maturity it contains a lacteous starchy liquid, which with maturity acquires a saccharine character, and forms a delicious refreshing beverage. The fruit has been preserved for years by drying it in the sun, when it becomes coated with a preservative efflorescence of sugar; the skin is usually stript off before the efflorescence appears, as it gives the fruit a disagreeable flavour. The blades of the large oblong B. leaves are employed in thatching, and the petioles, being formed of tenacious fibres, yield material for textiles.



Banana.

Bana'na Bird (*Icterus xanthornis*), a genus of *Icterina* or American starlings, occurring in the W. Indies and tropical America, and allied to the Baltimore Bird (q. v.). The plumage is a darkish brown, the wings being striped with white. It is readily tamed, and builds pendulous nests like others of its group.

Ban-Arrière. The heer-ban or hériban (summons or proclamation of the army) was first defined by the capitularies of Charlemagne of 807 and 812. All benefices were held on condition of military service in public and private war (*Wehr* and *Friede*). Ban was, therefore, applied to the levy of the barons proper, or peers of the court, who were the immediate vassals of the crown, and carried their own banners to the field; B.-A. to the secondary levy of vavassors, chatelains, &c., who were sub-tenants. This B.-A. must be distinguished from the service of allodial proprietors (*heerman arimanni*), who were also bound by the capitulary of 813 to furnish soldiers according to the extent of their lands. These probably served under the counts of their neighbourhood. There were complete feudal levies at Bovines under Philippe Auguste, and at Courtrai under Philippe the Fair. Permanent troops on pay were not established in France till 1444. See Meyer, *Esprit, Origine, et Progrès des Instituts Judic.* (1818 et seq. 5 vols.).

Ba'nas, or Bu'nas, the name of three rivers in India. The largest rises in the Aravulli mountains, Rajputana, flows N.E. and E. to the Chumbul, and so to the Jumna and Ganges. Another rises in the same range, and flows S.W. to the Runt of Cutch. The third, in Bundelcund, flows N.W. to the Sone, an affluent of the Ganges.

Bana's, a frontier province in the S. of Hungary, consisting of the counties of Temesvár, Krasso, and Torontál, with an area of 8648 sq. miles, and a pop. (1869) of 1,028,263. It is one of the richest portions of the Austro-Hungarian monarchy, yielding various grains, tobacco and millet, and wine equal to the best produce of Burgundy. There are also mines of iron, copper,

coal, gold, silver, and zinc. Besides steamboat communication on the Danube, B. has now the advantage of several lines of railway. The capital is Temesvár (q. v.). Originally a Hungarian territory, B. formed an Austrian crown-land from 1849 till 1860, when it was restored to Hungary. The B. derives its name from having been originally governed by a *Ban* (q. v.).

Banawaram, an ancient town in Mysore, India, 81 miles N.W. of Mysore. Hyder Ali removed a great number of the inhabitants to the neighbouring town of Nagapuri; but owing to the unhealthiness of the latter place, they were allowed to return to their former homes. Pop. about 10,000.

Ban'bridge, a town of Down county, Ulster, Ireland, on the left bank of the Bann, 76 miles N. of Dublin, with an important manufacture of linen. There are also large thread factories and chemical works. B. is connected by railway with Belfast and Dublin. Pop. (1871) 5600.

Ban'bury, an old town of Oxfordshire, on the right bank of the Cherwell, 21 miles N. of Oxford, and 38 S.E. of Birmingham, and a station on the Birmingham and Oxford Railway. It lies in the fertile 'red land' of Oxford county, and has manufactures of implements of husbandry, plush and girth webbing, cheese, and the celebrated 'B. cakes.' In the beginning of the 12th c. a strong castle was built here by Alexander de Blois, Bishop of Lincoln, which sustained several sieges, and was finally dismantled by the parliamentary forces in 1646. In 1469 the Yorkists were defeated at the battle of B., fought on the neighbouring plain of Danesmore. B. returns one member to Parliament. Pop. (1871) 4122; of parliamentary borough, 11,726.

Banco is an Italian word meaning a seat or bench. The expression 'sitting in B.,' or in *banco*, as applied to the law-courts, means the sitting of the judges in their respective courts, according to statute.

Ban'ca, an island in the E. Indian archipelago, belonging to the Dutch, lies E. of Sumatra, in lat. $1^{\circ} 30' - 3^{\circ} 5' S.$, and long. $105^{\circ} 10' - 106^{\circ} 53' E.$ Its products are gold, iron ore, silver, tin, and amber. In 1872 the exports amounted to £533,137. The capital is Minto. Area, 6883 sq. miles; pop. (1872) 62,216, the natives and Chinese numbering about 62,000.

Ban'co a commercial term, denoting the standard money in which a bank keeps its accounts, as distinguished from local currency.

Ban'croft, George, a leading American historian, was born 3d October 1800, near Worcester, Massachusetts, being the son of Dr Aaron B., a Unitarian minister, and author of a *Life of George Washington, Sermons on the Doctrines of the Gospel*, &c. Young B. studied at Harvard College; went from thence to Göttingen and Berlin, coming in contact with Hegel, Goethe, Varnhagen von Ense, Schleiermacher, Von Humboldt, and others. On returning to America, he threw himself into historical literature and politics, declaring himself a keen democrat; filling, under President Polk, the offices of Secretary to the Navy, and Ambassador Extraordinary and Plenipotentiary to England. He wrote several historical works, which, in the end, he incorporated in his *History of America* (10th vol. 1869), one of the best written, and, at the same time, most substantial and accurate historical works of the present time. It has been translated into several continental languages. In 1855, his contributions to the *North American Review* were published under the title of *Miscellaneous Essays and Reviews*. From 1867 to 1871 B. was Minister Plenipotentiary to the Court at Berlin. Another American author of this name, **Hubert Howe B.**, has written a history of *The Native Races of the Pacific States of N. America*, of which 3 vols. have already (1875) appeared.

Ban'croft, Richard, Archbishop of Canterbury during a critical period of the history of the Church of England, was born at Farnworth, Lancashire, in September 1541; his father, John B., being a gentleman of the place, and his mother the niece of Hugh Curwyn, Archbishop of Dublin. B. was educated at Christ's College, Cambridge, and after a distinguished career as a clergyman, was consecrated Bishop of London May 8, 1597, and in that capacity attended Queen Elizabeth on her death-bed. Although of high repute as a man, a scholar, and even

as a statesman, he was a very fierce opponent of the Puritans; and in the Hampton Court Conference under James I. was foremost in the discussions that took place on the side of the Church of England. In October 1604 he succeeded Whitgift as Archbishop of Canterbury; next year he was sworn one of his majesty's (James I.) privy council; and in 1608 he became Chancellor of the University of Oxford. He died November 2, 1610, leaving his library to the see of Canterbury for ever. His literary work consists of a sermon and two tracts against the Puritans, and an unpublished letter on pluralities. The tracts are, *A Survey of the Pretended Holy Discipline* (1593), and *Dangerous Positions and Proceedings, published and practised within this Island of Britain, under Pretence of Reformation, and for the Presbyteriall Discipline* (1593).

Band, Military, is a body of musicians attached to a regiment of soldiers. The members of the B. are selected mainly from the ranks, but the bandmaster is commonly a civilian. The regulation number of instruments is very small, including only fife, bugles, trumpets, and drums; but it has long been the invariable custom that the officers of a regiment should, principally at their own expense, render the B. more effective by the introduction of other instruments, the chief of which are clarionets, oboes, flutes, bassoons, and a great variety of brass instruments. Modern improvements in the mechanism of the instruments, and the growing taste for music, have wonderfully increased the strength and efficiency of military bands. Those of Austria especially, the finest in the world, play as perfectly as an orchestra (the clarionets representing the violins), and often number seventy or eighty performers. Among our British military bands, those of the Grenadiers, Coldstreams, and Scots Fusiliers are the most distinguished.

Ban'da Isles, a group of ten volcanic islets, belonging to the Dutch, lying between the Moluccas and the smaller Sunda islands in the Indian archipelago, with a mean lat. of $4^{\circ} 30' S.$, and long. of $129^{\circ} 50' E.$ The chief trade is in nutmeg, the yearly export of which is about 60,000 lbs. Banda-Neira is the chief of the group, and the residence of the Dutch governor. Total area, 170 sq. miles; pop. (1872) 5600.

Ban'da Ori'ental, S. America. See URUGUAY.

Ban'dages are used by surgeons for the twofold purpose of applying compression and keeping a part in position. We have an example of the former when a pad and bandage are applied to a bleeding part to arrest the hæmorrhage, and of the latter when a bandage is applied to keep a broken limb in position. B. are generally made of cotton, linen, flannel, or carbolie gauze, but any kind of cloth may be used. The cloth is cut up into strips of variable breadth, from a fraction of an inch to a foot or more, according to the purpose for which the bandage is required. They are generally wound up like a roller, which enables them to be more easily applied. Very narrow B. are required for the fingers and toes, broader for the limbs, and the broadest of all when the whole body is to be encircled in a bandage, as in the case of a fractured rib, when a flannel bandage is wrapt round the chest. Special B. are required for special purposes, and for particular parts of the body. In applying B., care must be taken to have them so applied that they will maintain sufficient pressure without unduly interfering with the vitality of the part. When applied too tightly, B. are apt to cause death of the parts. In bandaging the limbs, it is well to begin at the extremities, and bandage upwards. By so doing, the risk of interfering with the venous circulation is avoided.



Bandage across foot.

Bandajan, a Himalayan pass, on the S. boundary of Kuna-war, at a height of 14,000 feet, is covered with perpetual snow.

Banda'na, a variety of printed cotton goods originally made to suit the taste of oriental nations, where cloth with the same kind of patterns had long been manufactured by native artisans. The B. style consists in discharging the colour from a Turkey-red ground by the action of a strong solution of chlorine, brought to bear on the particular portions to be discharged, by specially

constructed machinery. The pattern on the oriental cloth which the European B. has supplanted was produced by tightly tying up the portions of the cloth before dyeing, by which the constricted parts were kept free from the dyeing agent when the piece was immersed in the dye-vat.

Bande Noire (black band), a title of reproach given to those who bought the property of the Church and of the emigrants during the first French Revolution, after it had been confiscated by the dominant party in the state. They unquestionably destroyed many objects of historical interest; but it is affirmed that the subdivision of the large estates into small holdings has produced a large class of peasant-proprietors, a thrifty and industrious race, forming an important element of the national strength of France.

Ban'del, Joseph Ernst von, German sculptor, born at Ansbach, Bavaria, 17th May 1800. He studied at the Academy of Munich, and resided in that city for fourteen years. His *Mars Reposing*, an equestrian work, won him a high reputation. His statue of *Charity*, upon which he worked for ten years, is one of the most beautiful pieces of modern German sculpture. His greatest work, however, is the colossal statue of *Hermann*, the ancient national hero, situated on a hill overlooking Detmold, in Lippe, unveiled in 1875. This statue, in copper, is 80 feet high. B.'s statues are distinguished for their nobility of style and ease and command in execution. His busts are full of expression and movement. B. died at Donauwerth in 1876.

Bandello, Matteo, an Italian writer of fiction, born at Castelnuovo, Piedmont, about 1480. Abandoning his early profession of a monk, he devoted himself in Rome and Naples to study. After the battle of Pavia (1525) he followed François I. to France, and in 1550 Henri II. appointed him to the bishopric of Agen, but he devolved his episcopal duties on the Bishop of Grasse, that he might have leisure to complete his *Novelle* in his native language, which were published at Lucca in 3 vols. in 1554. B. died in 1562. A posthumous volume was added in 1573. There were numerous editions of the *Novelle* in the 18th c. The latest is that of Turin (1853). B.'s tales, like those of the Decameron, are unaffectedly simple, and pure in style, but the morality is not of a lofty tone. Other writings of B.'s are *Canti delle Lodi della S. Lucrezia Gonzaga*, and *Rime* (Tur. 1816).

Ban'derole, a small streamer or banner on a crozier, a military weapon, or the mast of a vessel. Also, in architecture, an inscribed band on Renaissance buildings, similar to those now used for mottoes on coats-of-arms.

Ban'dicoot, a genus of the order *Marsupialia* or 'pouched' mammals, forming the type of the family *Peramelidae* of that order, and found in Australia. These forms are of small size, and are included in the *Entomophagous* (or insect-eating) division of the order. They represent in Australia the moles, hedgehogs, and small insectivora of the Old World generally. The hind-limbs in the bandicoots are longer than the fore-limbs, the latter members possessing five toes each; of which, however, the outer and inner digits are rudimentary, only the three central ones being fully developed. They are nocturnal in habits, and burrow with great ease. They progress by a series of running leaps, in consequence of the greater length of the hind-limbs. Six incisor teeth exist in the lower, and eight or ten in the upper jaw; large canines exist; the premolars number six, and the molars eight in each jaw. The total number of teeth is about forty-six or forty-eight. The marsupial pouch in the B. opens backwards in some species, instead of forwards as in other marsupials. These forms are represented by the *Perameles lagotis*, or native 'rabbit' of Australia, so named from the size of the ears. *P. nasuta* and *P. gunnii* are other species of the typical genus. The allied genus *Charopus* wants the two outer toes of the fore-feet.

Bandicoot Rat, or **Great Indian Rat** (*Mus giganteus*), not to be confused with the marsupial bandicoots described in the article Bandicoot, is a true rodent, included in the rat and mice family (*Muridae*). This form is the largest of the rats, averaging 2 feet in length including the tail, and weighing 2 or 3 lbs. This rat occurs in India and Ceylon, and inhabits dry places, burrowing to great depths. It is very destructive to plants and fruits, and is also said to attack poultry. It is coloured black in the upper, and grey on the under parts.

Bandiera, Attilio and Emilio, two brothers, descended from an aristocratic Venetian family, who were among the earliest victims to the cause of Italian liberty. In 1842, while lieutenants in the Austrian navy, they began a correspondence with Mazzini, and in the following year made an effort to stir up revolt, which proved abortive. After seeking refuge for some time in Corfu, they were seized in Calabria, tried in secret, and, along with seven companions, shot in the public square of Cosenza, July 25, 1844. See Ricciardi, *Storia dei Fratelli B. e Consorti* (Flor. 1863).

Bandinelli, Baccio, an Italian sculptor, born at Florence 1487, died there 1559-60. Unfortunate in his proud and jealous temperament, he was also unfortunate in his contemporaries, Michael Angelo and Benvenuto Cellini, whom it was his vain ambition to rival. He is best known for his *bassi-relievi* of the prophets, apostles, virtues, &c., in the cathedral of Florence; and his figure of Christ at the tomb, in the church of the Annunziata, Florence—which figure he is said to have completed for his own tomb shortly before his death—is a work of very rare excellence.

Ban'dit (Ital. *banditto*, comes from the Teutonic *ban*, a proclamation, which, though it generally conveys the idea of outlawry, as in the phrases 'ban of the Empire,' 'ban of the Church,' yet does not necessarily do so, as we see from the still more familiar phrase 'banns of marriage'). The name B. is given in Italy to an outlawed robber. The Italian banditti formed communities or corporations, and submitted themselves to be regulated by stringent laws. They were long the scourge of Italy, but in 1820 the Papal troops succeeded in partly breaking up their haunts. They are still to be found on the frontiers of Naples, where they combine the occupations of husbandman and brigand. In 1812 the Neapolitan government was under the necessity of concluding a treaty with 'Peter the Calabrian,' a formidable B. chief; and sometimes the banditti were so numerous and daring that it was necessary to send regular troops against them. Sicily is still infested with robber bands, and at one time they were so powerful there that it was deemed politic to treat them with confidence. The disturbed state of Italian society in 1848-49 swelled the ranks of the banditti with refugees and desperate men of all kinds; and under the command of Beltramo, whose death occurred in 1851, they were strong enough to engage the Austrian troops of the army of occupation. The Italian banditti, though by no means so formidable as they were, still occasionally succeed in procuring large sums for the ransom of rich captives.

Bandoleer, or **Bandaleer**, was a belt worn by musketeers two centuries ago over the left shoulder, and having attached to it twelve small boxes, each of which contained sufficient gunpowder for one charge.

Ban'doline, a preparation made by hairdressers for stiffening and fixing stray hairs in toilet operations. It is said to be prepared from Iceland moss, which it sometimes may be, but more commonly it is made from gum tragacanth, perfumed with some essential oil.—A B. is also an obsolete form of a musical instrument.

Ban'don (Gael. 'the brown lea-field'), a town in the county of Cork, Ireland, on a river of the same name, 19 miles S.W. of Cork city, with manufactures of linens, camlets, coarse woollens, and leather. There are also distilleries, dye-works, flour-mills, and bleaching-fields. B. returns one member to Parliament. Pop. (1871) 6131, of whom 4186 are Roman Catholics. The river B. rises in the Carbery mountains, and enters the sea at Kinsale, after a course of 40 miles. This is Spenser's 'pleasant Bandon, crowned by many a wood.'

Bands, a portion of clerical dress in the Presbyterian Church, are a relic of the ancient *Amice*, which was derived from the Jewish *Ephod*, and in primitive use was nearly a counterpart of the modern white neckcloth, but falling down so as to cover the neck and shoulders.

Baneberry. See *ACTÆA*.

Banff, the capital of Banffshire, a royal burgh (since 1372) and seaport at the mouth of the *Doveran*, on the *Moray Firth*, 45 miles N.N.W. of Aberdeen, connected by a bridge of seven arches with the town of Macduff. The harbour is occasionally

silted up with sand. B. exports cattle, corn, salmon, and herrings. It is one of the Elgin burghs (the others are Elgin, Cullen, Inverury, Kintore, and Peterhead) which return a member to Parliament. Pop. (1871) 7439. B. is the birthplace of the notable Archbishop Sharpe.

Banffshire, a north-eastern Scottish county, bounded N. by the Moray Firth; E. and S. by Aberdeen; and W. by Elgin and Inverness. Area, 686 sq. miles. It has a seaboard of about 30 miles, the surface bordering on which, for several miles inland, is for the most part level. In the S. and S.E. the surface is mountainous, but has numerous fertile valleys. Ben-Muic-Dhui, 4296 feet, once thought to be the loftiest mountain in Scotland, is partly in B. The highest peak in B. is North Cairngorm, 4090 feet. The chief rivers are the Spey and the Doveran, the former the most rapid of British rivers. Both granite and the old red sandstone abound, and the 'Portsoy marble,' a richly variegated species of serpentine, has long been celebrated. The metallic treasures are small, though lead and iron are found, as well as small quantities of antimony and plumbago. Agriculture is in an advanced state, and about a third of the soil is cropped. Large quantities of cattle are bred; weaving, tanning, and distilling are important branches of industry, and herring and salmon fishing support a large proportion of the inhabitants. The principal towns and villages are Banff, Macduff, Portsoy, Keith, and Cullen. B. returns one member to Parliament. Into the walls of the old church of Gamrie, which was discontinued as a place of worship only in 1830, the bones of the Norsemen slain at Bloody Potts were built, hence its popular name, 'the Kirk of Skulls.' Pop. (1871) 62,023.

Bangalore, a fortified town of Mysore, India, and the chief military station of the country, 180 miles W. of Madras, with which it is connected by railway. It stands 3000 feet above the sea-level, and has an excellent climate, with an abundant supply of good water. In 1791 it was stormed, and taken by the British under Lord Cornwallis. B. was founded by Hyder Ali, and one of its finest buildings is the palace of Tipoo Saib. The neighbourhood is exceedingly fertile, and there are important manufactures of cotton and silk. Pop. (1872) 142,513. The executive district of B. has an area of 2914 sq. miles, and a pop. (1872) of 828,354.

Bangkok, capital of the kingdom of Siam, on the Meinam, and 20 miles from its mouth. Pop. 500,000, half of whom, forming the commercial community, are Chinese, who, for the right to trade, pay three dollars each on entering the kingdom, and are taxed to the same amount triennially. The tax is not onerous when the extent of the commerce is regarded. In 1874, 484 vessels of 131,676 tons entered the port—103 vessels being British. In the same year the exports from B. amounted in value to £1,225,864, the chief articles being rice, sugar, pepper, teak planks, tin, teel-seed, rosewood, and cardamums; while the imports amounted to £964,128, the chief articles being cotton, linen, woollen, and silk manufactured goods and opium, of which alone the imports amounted to £90,089. The situation of the town is picturesque, and its environs are beautiful, its appearance having gained for it the name of the 'Venice of the East.' Many of the houses are afloat on rafts on the river or the canals, and the land houses are raised six or eight feet from the ground on piles, and are reached by ladders. There are few streets, and traffic is carried on by the numerous canals. B. is the residence of the two kings of Siam, the palace of the first being about a mile in circumference, and containing the hall of the sacred white elephant. There are numerous temples. See Bowring's *Kingdom and People of Siam*.

Ban'gor (Cymr. *Ban-choir*, 'the high choir'), a burgh and seaport, Carnarvonshire, and an episcopal see, dating, it is said, from 550, is on the Menai Strait, and about 60 miles W. of Chester. The scenery in the neighbourhood is singularly beautiful, and B. is in consequence much resorted to. It has also been greatly benefited by the opening of the Chester and Holyhead Railway. The principal industry is slate-quarrying, the slates of Llandegai being sent everywhere. Along with Carnarvon, Conway, Criccieth, Nevin, and Pwllheli, B. sends one member to Parliament. B. cathedral contains the tombs of a few Welsh princes, and several eminent ecclesiastics. Pop. (1871) 9859.

Ban'gor (originally *Bannchar* in Gael., 'the pointed hill,' 266

named probably from a hill near the town), a seaport of Down county, Ireland, on the S. side of Belfast Lough, 12 miles E.N.E. of Belfast, with manufactures of linen, cotton, and muslin embroidery. It also exports cattle and provisions. B. is connected by rail with Belfast. Pop. (1871) 2560. There still exist the ruins of the great abbey of B., founded in 555 by St Cungall.

Bangor, a flourishing city of Maine, U.S., on the right bank of the Penobscot river, 230 miles N.E. of Boston, with which it is connected by railway. It lies 60 miles from the mouth of the river, at the head of the tidal water, and is accessible to vessels of 1400 tons burthen, with full cargoes. B. has a larger timber trade than any other city of New England, this single article of export amounting in 1874 to £45,000. There are many fine public buildings, including the custom-house and post-office, a theological seminary, and a large orphanage erected in 1872. B. has two daily and four weekly newspapers. Pop. (1870) 18,290.

Bangor Iscoed ('Bangor below the wood'), a village on the Dec, on the borders of Flint and Denbigh shires, N. Wales. It was the seat of a monastery said to have contained 2400 monks in the 6th c., but no traces of the building now exist. Pop. (1871) 554.

Bangorian Controversy, the name given to a once famous controversy provoked by a sermon of Dr Hoadley, Bishop of Bangor, on the text, 'My kingdom is not of this world,' which gave much offence to the defenders of ecclesiastical authority. See HOADLEY.

Bangweolo, or **Bemba**, one of the largest lakes of Central Africa, lies about 200 miles S.W. of Lake Tanganyika, in lat. 11°—12° S., and long. 28° 20'—30° 35' W. It is of somewhat oval shape, and extends in an E. and W. direction, being 150 miles long and 80 broad. Many rivers enter it on the N. and E., the chief of which are the Chambeze (q. v.), Lopopussi, Lucla, and Lolotikira. It is also fed by innumerable smaller streams, and by the waters which in the rainy season flood the surrounding country to a distance of 40 miles. This margin of morass or 'sponge' is inhabited by numerous small tribes, and covered by aquatic vegetation, including the papyrus, arum, lotus, rushes, &c. ferns. The lake is 3688 feet above the sea-level, and abounds in fish, while its waters are sweet, and of a dark sea-green colour, probably due to the reflection of light by the fine white sand forming the bottom. It is drained by the great Luapula or W-bb's River (q. v.). B. was discovered in 1868 by Dr Livingstone, who revisited it for the purpose of further exploration, and died on its S. shore at Chitambo's village, May 1, 1873.

Ban'ian, or **Banian** (Hindustani, *banij*, a merchant, from a Sansk. root, *pan*, to sell), a term applied to the merchants in the W. of the Indian peninsula, particularly those in the seaports Bombay, Surat, Cambay, &c., who, in the way of business, penetrate Asia as far as the borders of China and Russia, and visit Africa as far S. as Mozambique. They form a division of the caste Vaisya, wear a peculiar cloak, also called B., observe fasts rigorously, and abstain from eating flesh, though a sect of them—the Bhattias—are, on the other hand, notorious for 'having reduced philosophical epicureanism to practice in forms more hideous and degrading than almost any which the Hindu Pantheon could furnish.' See Sir Bartle Frere's article on the Banians in *Macmillan's Magazine*, October 1875.

Banian Days, a nautical phrase denoting the days on which no flesh-meat is allowed to a ship's crew. The term is derived from the usage of the Hindu Banian.

Ba'nim, John, an Irish novelist, born at Kilkenny, April 3, 1800, commenced life as a portrait-painter, but subsequently betook himself to literature. His earliest production, his *Tales of the O'Hara Family* (Lond. 1825), was followed by *Boyne Water* (1826), *The Croppy* (1828), *The Denounced* (1830), *The Smuggler* (1831), *The Mayor of Windgap* and *Father Connell* (1842). Having been attacked by an incurable disease, a pension from the civil list of £150 was awarded him. He died at Windgap Cottage, near Kilkenny, 1st August 1842. B. has never been excelled as a depicter of the peculiarities of the Irish peasant, and it can hardly be said with justice that imitation of Scott has to any serious extent compromised his reputation for originality. See Murray's *Life and Correspondence of B.* (Lond. 1857).

Banish'ment, the punishment of legal exile from one's country. It is a penalty which has partly been abolished by statute, and, in so far as this has not been done, it has fallen into desuetude. Transportation also, by which was legally understood B. accompanied by the other penalties of felony, is also now abolished, with the substitution of PENAL SERVITUDE (q. v.).

Banister, a corruption of BALUSTER (q. v.).

Banjalu'ka, a strongly fortified town of Bosnia, Turkey, on the left bank of the Verbas, a branch of the Danube, in the N. W. angle of the kingdom. It has a gunpowder factory, several hot springs, and many Roman remains. Pop. 15,000.

Banjermassin', a Dutch residency in the extreme S. E. of Borneo (q. v.). It is in great part a flat country, but is intersected by a lofty mountain range, and is watered by the Banjer, Nagara, and other large rivers. The chief exports are gold-dust, diamonds, coal, ratans, gutta-percha, cotton, edible nests, and benzoin. There are several weapon factories, where highly ornamented arms are produced. Area, 5880 sq. miles; pop. (1871) 326 Europeans and 847,846 natives. The capital, B., is situated on the Banjer, 15 miles from its mouth, and is almost entirely built on piles. There is considerable trade, the chief imports being sugar, rice, silks, and gunpowder. Pop. (1871) 35,000.

Banjoemas', a port-town of Java, 22 miles inland from the S. coast, the residence of a Dutch governor, and the capital of a rich and productive province of the same name. Pop. 9000.

Bank, Banking. In the wide meaning of the word, any place where a money-dealer, or a company or corporation of money-dealers carry on their business, is a B. In this sense alone was the word understood when it first came into use. It is derived from the Italian word *banco*, a bench; the early money-dealers of Italy having been in the habit of sitting on benches in the market-places of the chief towns. The B. of Venice was established in 1171, the B. of Amsterdam in 1609. The latter was simply what we call a B. of *deposit*; that is, it took charge of money and valuables for the public, but did not lend. To receive money on deposit and to lend it have for long been the radical functions of a B.; and in England we should hardly speak of any institution or company by this name which did not receive money and lend it. A *public* B. in Great Britain is constituted by Act of Parliament or by royal charter. Its constitution, amount of capital, and the rights of its partners, depend on the laws and powers so conferred on it. A *private* B., again, is under the laws which regulate private trading companies. See JOINT-STOCK COMPANIES.

In considering how a B. conducts its business, this distinction between a *public* and a *private* B. need not be kept in view. For this purpose, we must keep in view the distinction between a B. of *deposit* and *loan* only, and one which is also a B. of *issue*. Under each of these divisions, the first requisite of success is public confidence. The B. must borrow before it can lend, and before the public will intrust its money, it must feel confidence that this money will be at once repaid when required. This confidence can only be gained by those answerable to the public for the solvency of the B. having a reputation for wealth and commercial prudence. Having more or less gained this confidence, the B. has its subscribed capital, that is, the money which its shareholders have paid on their respective shares, and its deposits with which to work for profit. For deposits some banks give interest, others do not; but none give a rate of interest to depositors nearly so high as they charge to those who borrow from them. Plainly no B. could afford to do this. The profit of the B. will now plainly depend upon the interest which it receives upon its working capital, diminished by the interest, if any, which it pays to its depositors, by the expenses of management, and by bad debts. Upon economy of management, therefore, and upon the avoidance of bad debts, will mainly depend the success of the B. The latter is in a mercantile community, even in fairly good commercial times, a matter of great difficulty. The manager of a B. and his directors—that is, a body chosen by the shareholders to counsel and assist him—must be thoroughly versed in mercantile affairs, cautious even in the best times, as knowing that seed then sown may bring forth its fruit in evil times. Above all, must they be firm; and the successful banker must have commercially neither friend nor foe. The chief point of the business of our bankers consists in the discount of bills. See BILL OF EXCHANGE. But loans are frequently made

on other securities, such as mines and manufactories. These securities, however, are seldom taken from free choice. When taken, it is generally because when the bills fall due, either they have not been paid, there has been visible difficulty in paying them, or the banker has had reason to suppose they have been paid by means of discounting Accommodation Bills (q. v. under BILL OF EXCHANGE). The banker has then but had the choice of two courses—either to make a bad debt, by making the defaulter bankrupt, or that of taking such security as the trader has to give, which may be that of a mine, manufactory, or something equally hazardous. If he take the latter course, the banker is plainly going out of his legitimate path of business, by becoming himself a mining master or manufacturer. There have doubtless been many cases in which, by taking this course, a B. has not only retrieved a debt which would otherwise have been bad, but has made immense profits by so doing; nevertheless it is a course severely to be reprobated. The most cautious banker must run some risk, and he must consequently occasionally make bad debts, nevertheless, cautious banking in the United Kingdom is on the whole safe as well as lucrative; and the failures of the last twenty years have all been the result of infatuation which might seem incredible, were it not for the fact of universal application, that the first fatal step once taken, the road to ruin is easy.

The second class of B. has a source of profit besides those of its subscribed capital and deposits—that is, on what is called its *issue*. This is its Promissory Notes (q. v. under BILL OF EXCHANGE); that which we call a bank-note being simply a promissory note by the B. which issues it to pay the bearer on demand the sum written in it. Now, if any one discounting a bill with a B., or otherwise taking a loan from it, agrees to take the loan in the B.'s promissory notes instead of in coin, it is plain that, so long as it is not required to give coin for these notes, the interest paid to the B. on account of the loan is almost wholly profit. A trifling deduction must be made for the expenses of making and maintaining the note circulation and general cost of the establishment; but this is all.

The interest, then, which a B. gets on its note circulation may be said to be virtually clear profit. Suppose, then, a B. to make a loan for a fixed period, in its own notes, does it necessarily make a clear profit of the interest agreed to be paid for the period? It lends say £100 in its own notes for a year, agreeing to take £5 of interest for the year's loan, does it make £5 of profit? It may do so in one transaction, but there are limits to the possibility of its doing so. There is a natural limit, and our legislature has imposed an artificial one, we suppose from the belief that the natural force was insufficient. The natural limit to a B. issuing notes is simply that the public, not requiring them, will not keep them. Every householder keeps a certain amount of money for daily requirements in his desk, and if he keeps this in B. notes, this is so much profit to the B. But whenever he gets a sum in excess of this requirement, he pays it into the B. with which he keeps an account, from which it is returned for gold to the B. whose promise to pay it bears; banks periodically exchanging notes, drafts, cheques, &c., and paying in gold the balance that arises on the account. Thus the £5 will be diminished by the interest paid to the depositor on so much gold. In London, the exchanges are effected through the Clearing House (q. v.), and there are similar establishments in some of the provincial towns.

The legislative check upon the issue of banks imposes on them the necessity of keeping in their vaults an equivalent in gold for every note issued beyond a certain amount, which amount is called the B.'s 'fixed issue.' This limitation proceeds on the theory that an unlimited right of issue would be followed by an increase of issue, which, by augmenting the quantity of money in circulation, would artificially raise the prices of commodities in general. At least, it was a general belief that the banks were by their issues causing this effect which led to the restrictive B. Acts of 1844 and 1845.

The author of these acts, however, Sir Robert Peel, according to Mr Gladstone, who was then a member of his cabinet, was largely influenced by his faith in another principle—namely, that the whole business of B. issue ought to be in the hands of the state. 'Sir Robert Peel,' says Mr Gladstone, in his speech on Mr Goschen's Bankers' Act Amendment Bill (17th March 1875), 'proceeded steadily on the principle, that where the law imposed restrictions on issuing banks, these restrictions ought to be maintained; and, moreover, Sir Robert Peel did that with reference to

a wider principle still—namely, the principle that the state ought to get into its hands the whole business of issue.

It would lead us quite beyond the necessary limits of this article to discuss these questions. An issue in the hands of the state would presumably give the public the profits of the B. issue of the country, which at present goes into the pockets of private bankers and of the joint-stock B. shareholders; but may not the same be said of the state taking to itself any other lucrative field of business, which it has hitherto been considered wise to leave open to British commercial enterprise? Then, as to the wisdom of legal restriction on issue, seeing that there is a natural law of restriction, may it not be, as has hitherto been found in all connected with trade, that the unfettered operation of the natural law is best?

Giving all due weight to the authority of Sir Robert Peel, we may fairly recall to mind the fact that, at the date of his B. Acts, he had but newly awakened to belief in the principles of free trade; and it is not unreasonable to suppose that he may not then have been fully awake to the whole detail of these principles. Issue is not free now, and some banks in the United Kingdom are under different laws as regards restrictions from others; the result being, what is sure to happen under so anomalous and unnatural an arrangement, that there is general discontent.

The Bank of England.—This, the largest banking establishment in the world, was projected by William Paterson, a Scotchman. It received its charter of incorporation on 27th July 1694. Its original capital was £1,200,000, which it lent at interest to the government of William and Mary. Its original charter has from time to time been renewed, the last renewal being under the Act and charter of 1844. Under these, the B. is divided into two compartments, the *Issue* and the *Banking*.

Previous to the Act of 1844, the government debt to the B. was £11,015,100. This was, by the Act, declared to be a debt due to the issue department, which was accordingly allowed to put in circulation notes to that value, without holding any gold. By 1844 the value so authorised to be issued had, in consideration of certain securities, been raised to £14,000,000. An additional million of issue was authorised by the Act, on account of the lapsing of the right of issue of some country banks. Thus, the total authorised issue, without holding gold, was by the Act £15,000,000, which is the present authorised value. The B. must pay to government the profit which it makes on the extra million. And the profit of the issue department is the interest at 3 per cent. on the £14,000,000 of government debt, which is £420,000, less £180,000 paid for stamp duties, and £160,000 of expenses; the deductions together amounting to £340,000, leaving a net profit of £80,000. Bullion and foreign coin are a source of profit to the B. Being worth £3, 17s. 10½d. per ounce, the B. buys them for notes at £3, 17s. 9d. Holders can have them coined free of charge at the mint, but the delay causes a loss of 1½d. per ounce.

In its banking department, the B. of England differs only from other banks in its having the custody and management of the funds of the state. For managing the public debt, the B. receives about £247,000, against which there is about £124,000 of expenses. The other profits of the B. are derived from employment of its deposits, on which it allows no interest, and of its capital. The following is a copy of the weekly account of the B. of England, on 17th February 1875:—

ISSUE DEPARTMENT.—February 17, 1875.

Dr.		Cr.	
Notes issued, . . .	£35,023,450	Government debt, . . .	£11,015,100
		Other securities, . . .	3,984,000
		Gold coin and bullion, . . .	20,023,450
		Silver bullion,
	£35,023,450		£35,023,450

BANKING DEPARTMENT

Dr.		Cr.	
Proprietors' capital, . . .	£14,553,000	Government securities, . . .	£13,595,034
Reserve, . . .	3,424,835	Other securities, . . .	18,800,241
Public deposits, . . .	5,195,080	Notes, . . .	9,360,330
Other deposits, . . .	18,065,308	Gold and silver coin, . . .	839,578
Seven day and other bills, . . .	355,924		
	£44,595,147		£44,595,147

The issue account is credited with the *fixed* securities, together £15,000,000, and debited with their constant equivalent, the 'notes issued.' These notes, it will be seen, are to the extent of £9,360,330 in the banking department. This is called the 'note reserve.' The remainder of the £35,023,450, that is, £25,663,120, is in the hands of the public, and is called the 'active circulation.' The banking department is debited with the fixed capital, £14,553,000, with the 'rest' or surplus, £3,424,835, with public deposits, and with 'other' deposits, being those of individuals, firms, London bankers, &c. On the credit side are government securities, a safe and readily convertible investment; 'other' securities, composed of bills discounted, bonds on which advances have been made, &c.; and the reserve of notes and coin immediately available for advances. The figures (£9,360,330) denoting the notes in the banking department are simply an arithmetical expression for the bullion in the issue department available for the banking department. The 'reserve,' then, of the B., by the above account, was £9,360,330 + £839,542 = £10,199,872. Since 1844, the reserve stood highest—£17,861,747—on June 21, 1871, when the private securities were £16,816,887, and the discount rate 2½ per cent. It stood lowest—£1,552,686—on November 13, 1857, when the private securities were £26,113,453, and the discount rate 10 per cent.

Generally, gold tends to leave the B., and reduce the reserve, when the short exchange of London or Paris falls to 25s. 10c., while an opposite effect is produced by the exchange rising to 25s. 33c. It is when this all-important *reserve* is seriously diminished that commercial panic is prone to arise. Till it does arise, restriction of issue is unnecessary, and then the restriction can no longer be maintained. Thrice since the Act of 1844—during commercial panics in 1847, 1857, and 1866—the government of the day has taken the responsibility of authorising an extra issue of notes.

Joint-stock and Private Banks in England and Wales.—There are at present 114 private and fifty-four joint-stock banks in England and Wales.

The total fixed issue of the private banks is, . . . £3,845,594
The total fixed issue of the joint-stock banks is, . . . 2,652,993

Total fixed issue of private and joint-stock banks of England and Wales, . . . } £6,498,587

Banks in Scotland.—The earliest established B. was the B. of Scotland, instituted by charter of incorporation from the Scotch Parliament in 1695. It gave the first impetus to Scotch industry, which has since had such an immense development. It was followed by the Royal B. in 1727, and the British Linen Company in 1746. The object of this institution was specially to encourage the linen manufacture of Scotland, but it gradually fell into the course of common business. The failure of the Western B. in 1857 has been the greatest Scotch commercial disaster of this century. It is, however, to be observed, that the company was not properly speaking insolvent, for it paid its creditors—that is, its depositors and note-holders—in full. Since then, the prosperity of Scotland has been unexampled, owing greatly to the excellence of its banking system and management. 'I know,' says Mr Gilbert (*Banker's Magazine* for March 1875), 'of no better illustration of the beneficial action of banking in promoting the development of natural resources than the present advanced condition of Scotland.'

The total authorised circulation of the Scotch banks is £2,749,271. On January 23, 1875, their total actual circulation was—

Of £5 and upwards, £1,996,453
Under £5, 3,865,759
Total, £5,862,212

At the same date the Scotch banks held, in round figures, seventy-seven millions of deposits, while their total working capital, exclusive of note circulation, was fully ninety millions. These facts, we think, show that in any question of right or power of competition, the right of issue exercised by Scotch banks is not extremely important. It is the force of the ninety millions, not of the £2,749,271, which the advocates of protection in the banking trade have to dread, though no doubt the issue helps to collect the deposits. Over the United Kingdom, there can be no doubt that the important part which banks play

is not by their issue, but as the recipients of deposits and makers of advances. At the same time, to deprive the Scotch banks of the right of issue would be an unquestionable injury to them, and to the commerce and general prosperity of Scotland, which they have done so much to promote.

Irish Banks.—The authorised circulation of these is £6,354,494. The actual circulation on January 23, 1875, was £6,882,942. The B. of Ireland is a national B., lending £2,630,769 of its capital to government. It was established in 1783. Its capital is £2,769,230, and its rest £1,077,000. It allows no interest on deposits.

Bank-Note Circulation of the United Kingdom.—For the week ending January 23, 1875, this was—

Bank of England (20th January),	£26,313,715
Private banks of England,	2,612,932
Joint-stock banks of England,	2,328,482

Scotch banks,	£31,255,129
Irish banks,	5,802,212
	6,882,942

£44,000,283

Bank-Notes, Manufacture of. The chief object in this manufacture is to make forgery as difficult as possible. Peculiar paper and ink, and intricacy of design, have all been brought to bear on this end by men who have made it their special study. But the ingenuity of the forger has sometimes been not less industriously exerted. Of recent years, however, there has been no extensive forgery of bank-notes. Since 1855 the notes of the Bank of England have been produced by the electrotype.

Bankruptcy, in law, and in its general meaning, is the condition of one who is unable to meet the legal demand of a creditor, and who has by his act or omission (see ACT OF B.) given legal proof of his inability. The condition of inability to meet a legal demand, previous to legal proof of the inability, is called *Insolvency*; and from insolvency there is, of course, the possibility of recovery without B. In Scotland, the condition of one who has committed an act of B. is called *Notour B.*

Of late years the B. laws of England and of Scotland have been the subject of endless discussion, especially in England, by parliament, chambers of commerce, and other societies interested in trade, and by the corporations of our trading cities. So long ago as 1825, the great mass of English statutes on this subject were consolidated, and several new and salutary provisions introduced; amongst others, those which allowed an offer of composition, and permitted a trader publicly to declare his insolvency, and equitable measures to follow the declaration. The Act of 1831 established a Court of B., and the office of official assignee, corresponding to the office in Scotland of *Trustee* under B. But still the B. law of England proved wholly inadequate to deal with this most difficult subject. By secret transfers, concealment of property, and the enormous expense of the B. Court and the other machinery required for winding up, and by endless delay, prospective dividends continued to grow smaller, until not unfrequently they altogether vanished. The Act of 1849 for the first time introduced 'arrangement clauses,' under which the bankrupt, with the necessary consent of creditors, was able to clear himself of debt *without the stigma of B.* This was an improvement, no doubt; still, as it was difficult to get sufficient value of creditors to consent, the great proportion of estates continued to be liquidated as formerly.

In Scotland, during the same period, from the expansion of its trade, and consequently growing importance of the subject, discontent with the existing B. laws had continued to increase. Yet some difficulty was felt in discovering where or in what the error practically lay. Lawyers and mercantile men read the Scotch statute, and its provisions, with a few exceptions, really seemed good. Its machinery was simple, the creditors from first to last keeping the management of the B. estate virtually in their own hands. They appointed their own trustee, who was superintended by a committee of their body called 'commissioners.' Trustees were, under the statute, called on to render an annual account to the Sheriff, showing exhaustively the past transactions, present position, and prospects of the estate. Yet, for some reason, results in Scotland were *nearly*, but probably not quite, as unsatisfactory as in England; dividends which originally seemed almost at hand and substantial, growing with the lapse of time more and more distant and visionary.

Such was the position of matters in both countries in 1854, when it occurred to Lord Brougham that it was highly desirable that the B. law of England and Scotland should be made the same, and that this end should be carried out by the repeal of the Scotch statute, and the substitution of the English Act of 1849. His lordship grounded his view on the general principle of its being most desirable that the mercantile law of the two countries should be the same. While the general principle was universally granted in Scotland, the special application was all but universally objected to by the legal and mercantile community, on several grounds. In the first place, the English were still in a state of chronic discontent with their own law. Then the machinery of a B. court was held to be cumbrous, and out of harmony with the legal institutions of Scotland; while the English system was statistically proved to be considerably more expensive than the Scotch.

An indignation storm from the London press, whose fury was directed against 'Scotch provincialism,' then burst over Scotland. It was productive of good, however, stimulating inquiry in Scotland, till the fact came to light that, while the provisions of the Scotch Act were generally excellent in the care which they took of the interest of creditors, these provisions were almost wholly ignored by trustees and all concerned in the management and supervision of the B. estate. Accounts of the trustees' *Intromissions* (see INTROMISSIONS), instead of being made up at statutory periods, were often hardly made up at all. Commissioners signed without auditing; returns to sheriffs were never made; dividends were indefinitely postponed pending petty law-suits, which only ended when there was nothing left to divide. The results of the whole controversy were, first, the Scotch B. Amendment Act of 1856, which continued the main provisions of the law as it previously existed, but made them efficient by the appointment of an Accountant in B., an officer whose business it is to see that trustees in B. make annual returns, in prescribed form, showing the funds of the estate realised and outstanding, the dividend paid, the legal and other expenses incurred, and the position and prospects of the estate generally. Of the returns so made, the Accountant must keep a register, open to all concerned. Besides this, it is his duty to exercise a strict supervision over the conduct of trustees, commissioners, and bankrupts, and he is bound to report any neglect or misconduct to the Court of Session, or to the Lord Advocate, either of whom may censure, remove from office, or prosecute criminally. The second result of the controversy above alluded to was the assimilation of the English B. law to the Scotch, by the passing of the English Act of 1869. Under it, the office of official assignee is abolished, and that of a trustee appointed by the creditors put in place of it.

Both English and Scotch Acts contain *Arrangement Clauses*; the former Act allowing a majority in number, and three-fourths in value, of the creditors to carry a composition without B., while the Scotch Act does not allow any majority to carry a composition previous to examination under B. The Comptroller in B. in England and the committee of inspection discharge the duties of the commissioners and Accountant in Scotland. By the Scotch Act of 1856, the judgment of the Sheriff is made final in competitions for the office of trustee. By a B. Amendment Act in 1860, power is given to the Scotch courts to recall a sequestration until three months after its date, on being shown that the procedure ought to be in England or in Ireland. This provision remedies the evil which formerly existed of English and Irish debtors coming to Scotland for the purpose of sequestration, and so getting quit of their debts without due notice of procedure to their creditors.

In a country whose commercial circumstances are ever varying, as are those of Great Britain, frequent repair and modification of B. law will doubtless be found necessary; meanwhile the law as it at present stands in England and Scotland is on the whole, we believe, found to work satisfactorily and efficiently.

Banks' Land, a large island in the Arctic Ocean, 70 miles S.W. of Melville's Island, and 100 from the N. coast of British America, extending in lat. 74° N. and long 116° W.

Banks' Peninsula is situated in the province of Canterbury, on the E. coast of the Middle Island of New Zealand, between 43° 37' and 43° 55' S. lat., and 172° 40' and 173° 9' E. long. Its area is estimated at 250,000 acres. B. P. is deeply indented with bays, the chief of which is the splendid inlet of Akaroa, on the S. The surface of B. P. consists of sharply

defined mountain ranges and peaks, containing abundant evidence of volcanic action, and covered with forests. These ranges end abruptly on the W. in the great Canterbury Plains, and the curious Lake Ellesmere (q. v.).

Banks, Savings'. See SAVINGS' BANKS.

Banks, Sir Joseph, was born at London, 4th January 1743 (O.S.), of an ancient family, having possessions in Lincolnshire. He began his botanical studies while at Eton, by reading Gerard's *Herbal*. At Oxford, Sibthorp, the professor of botany, did not lecture, and B. had to hire a lecturer on that subject. He succeeded to his father's estates in 1764, and was elected to the Royal Society in 1766. The same year he accompanied Sir Thomas Adams to Newfoundland on a botanical expedition. In 1768 he and his friend, Dr Solander (botanist), joined the scientific expedition sent out to Otaheite by Lords Bute and Sandwich, to observe the transit of Venus of 3d June 1769. They sailed in the *Endeavour* (Captain Cook), and on the return voyage visited the Society Islands, New Zealand, New South Wales, and New Guinea. In 1772, with Solander and a staff of assistants, B. sailed to Iceland, and examined its flora, fauna, and physical geography. He made a collection of Icelandic books and manuscripts, which he presented to the British Museum. In 1778, B. was elected President of the Royal Society, in 1780 he obtained a baronetcy, and in 1795 the Order of the Bath. In 1802 he was elected member of the Institute of France, and died 19th June 1820. B. wrote two tracts on *Corn Blight* (1803) and *American Sheep* (1809), and several papers in the *Transactions of the Horticultural Society*. His most important achievement was the introduction of the banana from Otaheite to the W. Indies. He left his botanical library and collection, which were of great extent, to the British Museum. The library was catalogued by Dryander; the collections have been made use of by Gärtner, Brown, Broussonet, and others.

Banks, Thomas, born at Lambeth, 22d December 1735, was trained as an architect, but devoted himself to sculpture in early manhood, and in 1770 carried off the gold medal of the Royal Academy. He was sent, at the expense of the Royal Academy, to Rome, and there produced his *Caractacus Pleading before Claudius*, a noble work, and his *Psyche with the Butterfly*, which in grace, symmetry, and classical elegance is held to rival the works of the ancient masters. He went to Russia on the invitation of the Empress Catherine, who purchased his *Psyche*, and commissioned him to carve a group of the *Armed Neutrality* in stone. After two years he returned to England, where he continued to practise his art till his death, 2d February 1805. Of his later works, the *Nymphs Consoling Achilles*, an oval alto-relievo, in which Thetis and her nymphs are seen rising from the sea, is not surpassed in the buoyancy and spontaneous movement of the figures by any work in ancient or modern art.

Bank'sia, a genus of plants of the natural order *Proteaceæ* (q. v.), named after Sir Joseph Banks, and peculiar to Australia and Tasmania. Only two of the fifty species of which the genus is composed are tropical. *B. grandis* has been known to reach a height of 50 feet, but excepting some six other arborescent species, the genus consists of shrubs, some of which attain a height of from 15 to 26 feet. The flowers of the *B. integrifolia* contain a large quantity of honey, whence it is called the honey-



Banksia.

suckle by the colonists. Various species of B. are commonly grown in greenhouses in Britain for the sake of their flowers.

Bank'sian Cockatoo' (*Calyptorhynchus Bankisi*), a species of cockatoo, occurring in Australia, the plumage being black or brown, variegated with spots of red or orange, with which colours the tail-feathers are also banded.

Bann (Upper and Lower), two rivers in the N.E. of Ireland. The first, rising in the Mourne mountains, passes Banbridge, Gilford, and Portadown, and falls into Lough Neagh; the latter, issuing from Lough Neagh, flows through Lough Beg, divides Antrim and Londonderry, and falls into the Atlantic near Portrush. A mile above Coleraine, where the B. falls over a ledge of rock 13 feet high, there is a valuable salmon-fishery. Here the Irish Board of Works have erected a lock and piers, to regulate the water-flow.

Bannatyne Club, instituted in Edinburgh in 1823 by Sir Walter Scott, for the purpose of printing scarce works bearing on Scottish history and literature, is named after George Bannatyne (a Scottish merchant, born 22d February 1545, died before 1608), the transcriber of the famous Bannatyne MS., preserved in the Advocates' Library. The works were to be printed uniformly and handsomely, the club, or, as often happened, some individual member, defraying the expense. The number of members, at first 31, was raised to 100, the annual contribution being five guineas. Its first president was Sir Walter Scott, and its first and only secretary David Laing. The annual meetings of the club, which were highly convivial, were held in December. They were, however, ultimately discontinued, and the club itself was dissolved 27th February 1861. Its publications, 116 in number, bring high prices at sales. In December 1874 a complete set was bought for the Glasgow Public Library, at the sale of the library of the Rev. Dr Stevenson, late Professor of Ecclesiastical History in the University of Edinburgh, for £204, 15s.

Banner. By this word we generally mean to indicate a flag or similar device used for ornament on important occasions, or to denote nationality or fraternity. Among all people there is a veneration for the national flag, which promotes the virtues of heroism and patriotism. Chiefly is this found in nations which have long been great, and whose colours have become the nucleus round which historical and traditional glory has gathered. From the earliest times we find that banners have been used in war, for the purpose above indicated, and for directing the movements of troops. The Roman standard was in the earlier days of Rome a spear with a bundle of straws. This was succeeded by the haughtier emblem of the eagle—since adopted by the Bonaparte dynasty, and by the American Republic.



Banner.

The ensign of the United Kingdom, or Union Jack, is formed by a combination of the three national emblems—the crosses of St George, St Andrew, and St Patrick. As a specimen of heraldry it is not considered to be very successful; nevertheless, *per mare, per terram*, 'the meteor flag' has well sustained the honour of the British name. In the navy the ensign is displayed on flags of various colours—most commonly red, yellow, white, blue, or black.

Internationally, the white flag is the token of peace or surrender; a red flag, of defiance. The black flag is the emblem of piracy.

Banneret, a knight who, for some deed of valour performed on the field, was entitled to bear a banner instead of a pennon. The act of elevating any one to this dignity consisted in cutting or tearing off the ends of the pennon. According to Froissart, Edward I. introduced this grade of knighthood; and the last knight-B. was John Smith, who received the honour from Charles I. after the battle of Edgehill.

Bann'ock (Cael. *bonnach*, a cake), a thick round cake common in the rural districts of Scotland and the N. of England.

The Scottish **B.** is made by kneading barleymeal or a mixture of barleymeal and pease meal with water, only to a softer consistence than is requisite for the oat-cake, and firing on a girdle or circular plate of cast-iron. Oatmeal forms the principal constituent of the **B.** of the N. of England.

Bannockburn, a celebrated village in the county of Stirling, three miles S.S.E. of the town of that name, so called from the rivulet of the Bannock, which falls into the Forth. It derives its fame from the battle fought 24th June 1314, between the Scots under Robert Bruce, and the English under Edward II., in which the former, although in numbers not more than a third of their opponents, were completely victorious. In the vicinity of **B.**, at Sauchie Burn, James III. was defeated in 1488 by his subjects, who had rebelled against him in the name of his son, and later in the day was assassinated. **B.** is otherwise chiefly noted as a seat of the woollen manufactures.

Banns of Marriage. Marriage according to the rites and ceremonies of the Church of England requires one of three preliminary forms—*License, Publication of B.*, or *Registrar's Certificate*. The publication of **B.** must, under statutes, be made audibly in church according to the rubric of the marriage service of the Church of England. It is to be made on three successive Sundays previous to the marriage, in prescribed form. Marriage without **B.**, unless by license or certificate, is void by statute. If either of those intending marriage is resident in Scotland, certificate of publication of **B.** in Scotland by the session-clerk of the parish in which it has been made is valid in England. In Scotland the publication of **B.** in church is required to constitute a regular marriage. It is directed to be done 'in an audible voice'; a direction, however, which is not always attended to. Marriage in Scotland is, according to the essential principle of the law of that country, necessarily valid without publication of **B.**, but the witnesses and celebrator are liable to heavy penalties. Strictly, the proclamation in Scotland ought to be made on three successive Sundays; but it is now allowed to make the three proclamations on one Sunday for a higher fee than usual. The object of the publication of **B.** is to inform the public of the intended marriage, so that if any one knows of any legal impediment, he may have opportunity to state it. Keeping this as the object in view, the law does not hold proclamation vitiated by an error in name, provided it appears that the name used was one by which the person proclaimed was known in the district in which he or she lived. A clergyman who celebrates a marriage, to which legal objection has been intimated to him, incurs penalties under ecclesiastical law. But if he refuse to celebrate without sufficient cause, he may be found liable in a civil action. (See MARRIAGE, SPECIAL LICENSE, REGISTRATION OF BIRTHS, DEATHS, AND MARRIAGES.)

Banquette (Fr.), in fortification, is a raised bank or ledge running along inside of the parapet, and thus enabling the soldier to fire over the rampart without too much exposure to the fire of the enemy.

Banshie. See BENSHEE.

Banswara, the capital of a protected state of the same name, in the Mewar Agency, Rajputana, India, is 200 miles S. of Ajmir. Pop. about 7000. The state, between Malwa and Gujerat, has an area of 1500 sq. miles, and an estimated population of 150,000. It became tributary December 25, 1818, agreeing to pay a sum not exceeding three-eighths of the revenue, which is about £30,000.

Bantam, the earliest Dutch residency in Java (1602), occupying the western portion of the island, with 607,400 inhabitants. The trade here has greatly declined. The seaport and capital, also called **B.**, situated 40 miles W. of Batavia, is now an insignificant village.

Bantam Fowl, a variety of the common fowl (*Gallus domesticus*), so named from its being supposed to have been originally brought from **B.** in Java. This variety is of small size. The legs are generally more or less completely feathered. Several distinct varieties of **B.** have been described. They are all distinguished for their courage and vigorous disposition.

Banteng (*Bos somidensis*), a species of ox inhabiting Java and Borneo, coloured black with white legs, and unprovided with a dewlap. The muzzle is pointed, and the back is highly arched

behind the neck. The Gaur-ox of India somewhat resembles this species, concerning the exact nature of which considerable doubt still exists.

Ban'try (named from the *Branntraighe*, descendants of Beann, King of Ulster, who settled in the S. of Ireland), a seaport town of Ireland, county Cork, at the head of the bay of the same name, 44 miles W. by S. of Cork. There is some fishing carried on, but the principal trade consists in exporting agricultural produce. Pop. (1871) 2421.

Bantry Bay, a deep inlet on the S.W. coast of Ireland, between Crow Point on the N., and Sheep's Head Point on the S., Cork county, one of the safest and most capacious roadsteads in Europe, though but little shipping resorts to it. At the head of the bay are two harbours, **B.** harbour, completely landlocked, being within Whiddy Island, and Glengarriff harbour, also sheltered by an island, but small, and used chiefly by coasters. The coast around the bay abounds in picturesque scenery, and the magnificent cataract of Hungry Hill lies 17 miles W. of the town of **B.** Admiral Herbert with the British fleet engaged the French fleet that brought James II. to Ireland in 1689 at the mouth of the bay; and some vessels of the fleet that carried the force intended for the invasion of Ireland anchored here, 22d December 1796.

Ban'ring (*Tupaia*), a genus of *Insectivorous* mammals, inhabiting the Indian Archipelago, and adapted for an arboreal life. The tail is longer than the body, and fringed. The feet are plantigrade, and possess five toes each. The claws are curved. The snout is prolonged and slender, and the eyes are large. The best-known species are the *T. ferruginea*, *T. nuvima*, and *T. javanica*.

Ban'ya-Nagy ('great mine'), in Ger. Neustadt ('new town'), a town in the E. of Hungary, county of Szathmar, near the borders of Transylvania, 85 miles E. of Debreczin. It has a royal mint, and is noted for its gold and silver mines, from which it takes its Hungarian name. Pop. 9082.

Ban'yan, an Indian tree (*Ficus Indica*) belonging to the natural order Moraceæ. It sends down roots from its branches, which, in their turn, become stems, and send forth similar branches and roots, and in this remarkable manner the tree



Banyan.

extends to a great distance, and often covers a large area with its leafy arcades. The fruits are about the size of cherries, scarlet, and produced in pairs.

Banyuls-sur-Mer, a town in the department of the Pyrénées Orientales, France, situated in the district where the Grenache and Rancio wines are produced. It was the scene of many fierce engagements at the end of the 18th c., between the Spaniards and the French republicans. Near it are four ancient towers, one of which marks the line of boundary between France and Spain. Pop. (1872) 2227.

Banyuwan'gy, the chief town of a Dutch province of the same name, Java, and a thriving seaport. Pop. 45,000.

Ba'obab, the common name for *Adansonia* (q. v.).

Bapaume, a fortified town in the department of Pas-de-Calais, France, with manufactures of laces, and woollen and cotton goods. The French army of the north was defeated here by the Germans under Von Göben, January 2 and 3, 1871. Pop. (1872) 2864.

Baph'omet, a symbol in use among the Knights Templars,

the meaning of which has not been satisfactorily explained. It is a small human figure in stone with two heads—one male, the other female—and the rest of the body being female. It is surrounded with serpents and astronomical signs, and furnished with inscriptions mostly in Arabic. One explanation of it is, that the name is a corruption of the word Mahomet, to whose faith the Templars were said to be secretly addicted. Another is that which derives the word from Gr. *baphé*, baptism, and *metis*, council or wisdom. According to this view, the Templars borrowed their symbol from one of the corrupt Gnostic sects, who were still to be found in the East, whose baptism of fire was regarded as a mode of spiritual illumination. For a full exposition of the latter view, see Hammer's *Fundgruben des Orients*. Specimens of the B. are to be seen in the archæological collections of Vienna and Weimar.

Bap'tism (Gr. *baptizo*, *bapto*, to dip, &c.). Washing the body with water, representing the removal of impurity and pollution in connection with religion, was much in vogue among ancient nations. In the ceremonial laws of Moses, as well as of Menu, elaborate directions are given for purifying from various kinds of defilement or uncleanness. B. also symbolised purification of the heart and life; and accordingly John the Baptist administered the rite of B. or ablation to those who, on hearing his preaching, professed repentance and promised amendment. B. was adopted as an initiatory rite by the Christian Church, and exalted into one of her sacraments. The chief points of importance connected with the sacrament are included under the heads of *the subjects for it*,—its *efficacy*,—and *the mode of administering it*, &c.

1. The first subjects for Christian B., as a matter of course, were adults. The converts from heathenism who professed their faith in Christ and willingness to live a holy life were immersed in water in the name of the Father, the Son, and the Holy Spirit. The practice of baptizing the infants of believers was soon introduced, however; by the 5th c. it was fully established in the Church, and has prevailed ever since, although it has been opposed by certain sects since the middle ages. 2. Regarding the efficacy of B., the Church of Rome in her canons (Co. of Trent) anathematizes those who teach that B. is a matter of indifference and not necessary to salvation, and who deny the propriety, necessity, or efficacy of infant B. She also holds that B. avails not only for the remission and removal of all sin, but also for the inward sanctification of the soul. The Reformed doctrine denies—(1) that B. conveys grace 'ex opere operato' (see SACRAMENTS); (2) that the co-operation of the Spirit always attends its administration; (3) that B. is the ordinary channel of conveying the benefits of salvation, so that those benefits cannot be obtained without it. On the other hand, it affirms that B. is—(1) a divine ordinance; (2) a means of grace to believers; (3) a sign and seal of the covenant of grace; (4) was intended to be of perpetual obligation; and (5) that the benefits signified by the sacrament will be conferred on all who receive it in faith, and on all infants who, on arriving at maturity, remain faithful to the vows made in their name. (See REGENERATION.) 3. There has been considerable controversy during the whole time of the Church's history regarding the proper mode of administering the sacrament, whether it ought to be by sprinkling or by immersion. It was one of the points on which the Eastern and Western Churches were divided; the E. holding to immersion, the W. to sprinkling. The modern practice of the Church of Rome is affusion or sprinkling. As a rule, those who oppose infant B. also hold sprinkling to be insufficient, the chief arguments brought forward in favour of this view being—(1) the classic usage of the word *baptizo*, and the usage of the prepositions *en* and *eis* in construction with it in the New Testament, together with the use of such expressions as 'buried with Christ in B.', alluding to a typical burying in water; (2) that immersion was the practice in New Testament times, as is indicated by such passages as Matt. iii. 16, Acts viii. 38. The arguments on the other side are—(1) an *a priori* one that the idea of purification is as clearly and frequently signified by affusion as by immersion; (2) that the usage of the word *baptizo* in the classics, the LXX., the Apocrypha, the New Testament, and the fathers, is by no means confined to immersion; (3) that the gospel is designed for all classes of persons and all parts of the earth—not merely for the strong and robust, but for the weak, the sick, and the dying. At any rate, the ordinary mode of administering the

sacrament in the early Church was by immersion, the sick only being sprinkled.

Besides immersion with the ordinary formula, various other ceremonies were formerly connected with the administration of the sacrament. The rite was regularly administered only twice a year, namely at Easter and Whitsuntide. Candidates made a public profession of their faith and renunciation of the flesh and the devil. After a course of fasting and prayer, the exorcist in a solemn formula declared them free from the bondage of Satan. Before and after the B. they were anointed with oil as wrestlers against spiritual enemies; after, they were signed with the cross, in token of being soldiers of Christ; tasted salt, milk, and honey, in token of receiving spiritual gifts and graces; had their ears and nostrils touched with spittle, to signify they would always listen to the truth and smell the odour of virtue. They returned home decorated with a crown and white robe, the one to signify their victory over the flesh and the devil, and the other their freedom and innocence.

As to the persons by whom B. was to be administered, considerable laxity prevailed at first, but as the hierarchy came to be established, the administration was confined to ordained clergy. High views regarding the necessity of B. for salvation tended, however, to counteract this exclusiveness, and in cases of emergency a lay person could administer B. to an infant, as is allowed yet in the Church of Rome.

Baptism, Infant. The difficulty in the question of I. B. is, that infants cannot make the profession of faith by which Christ is to be confessed before men, and hence cannot be members of his Church in the same sense as adults. The justification of the practice, therefore, must be based on an idea of the Church which includes the children of believers. The argument in favour of it is as follows:—1. The visible Church is a divine institution. 2. The visible Church does not consist exclusively of the regenerate. 3. The commonwealth of Israel was the Church. 4. The Church, under the new dispensation, is identical with that under the old. 5. The terms for admission into the Jewish Church were the same as are required for admission into the Christian Church. 6. Infants were members of the Jewish Church. 7. There is nothing in the New Testament to show that the children of believers should not also be members of the Christian Church. 8. Children need, and are capable of, receiving the benefits of redemption. For the other side of the question, see BAPTISTS.

Baptistery (Gr. *baptisterion*, a vessel used in baths, a bathing-place). As soon as the Christian Church began to be organised and established, for the more convenient administration of baptism, fonts were erected in the porches, or other convenient part of the churches. Then buildings called baptisteries were erected adjacent to the churches, in which the catechumens were instructed, and where were cisterns into which water was let at the time of baptism, and in which the candidates were baptized by immersion. They were generally circular or polygonal; and the B. still forms an important architectural feature of some of the finer churches in Italy and elsewhere.

Baptists generically hold the opinion—(1) that none ought to be baptized but adults who can make an intelligent profession of their faith; and, as a rule, (2) that the rite is not valid unless administered by immersion. Their chief arguments in favour of the first point are—(1) that repentance and faith are prescribed in the New Testament as conditions of baptism; (2) that the apostles did not baptize any till they were satisfied on this point; (3) that infants are thus excluded (a) by their inability to comply with the required terms, and (b) by their baptism not being enjoined in the New Testament; (4) that infant baptism was unknown in the early Church. Infant baptism was repudiated by the fanatical Anabaptist sects of the 16th c., as well as by the more moderate Mennonites; but the B., as the name is generally understood, are an offshoot from the English Independents. The first congregation was formed under John Spilsbury, in London, in 1633. Another was formed in 1639; and the 'new baptism' was effected by communication with the Mennonites of Holland. In 1643 the sect was so far organised and established as to draw up a Confession of Faith. In 1646 they had forty-six congregations in London and neighbourhood, while they were also gaining a footing in the American colonies. In 1647, for the help

they had given in the Civil War, they received from Parliament a declaration of toleration, which, however, was reversed next year by Presbyterian influence. They acquired influence again under Cromwell, and thirty-five of their clergy were among the first Nonconformists.

The original body of the sect have always held the Calvinistic doctrine of 'particular redemption,' and hence, as a distinctive title, receive the name of 'Particular B.' There are, however, two parties of them, though not two separate sects; the 'Free Communions,' who admit to the Lord's Supper those who have been baptized only in infancy, as well as adult B.; and the 'Close Communions,' who admit none but those who have been baptized as adults.

Bar is the name given to any lengthened piece of wood, metal, or other solid substance. See **IRON MANUFACTURE**.

Bar, or **Barr**, in heraldry, is the principal diminutive of the *honourable ordinary*—the Fess (q. v.), which is a horizontal band in the middle of the shield, occupying one-third of it. The B. occupies a fifth part, and may be borne on several parts of the shield, while the fess is confined to the centre.

Bar, in hydrography, is a deposit of mud and sand at the mouth of a river, preventing the passage of a vessel of any considerable burden except at high water.

Bar, in law, means the enclosed space in courts from which lawyers address the judge or jury. It also means the enclosed space where those accused of felony are placed during trial. In Scotland, the Lord-Advocate and the Solicitor-General have a right to sit within the B.; the former by statute, the latter by direction of the crown. A *Trial at B.*, in England, is one held before all the judges at the B. of the court in which the action is brought.

Bar, in music, is a line drawn perpendicularly across the stave to indicate a certain quantity of time or a certain number of beats.

Bar, Pleas in. In the law of England, a special P. in B. is a plea stating some ground on which the indictment should not be gone on with; such as that the accused had been already tried or pardoned for the alleged offence.

Bar, Toll. The original erection of toll-gates for the purpose of levying a tax for the maintenance of roads excited violent opposition in England, and their continuance has led to serious riots in many parts of the country. While none deny that roads must be kept in repair, and consequently that funds must be raised for doing so—how to raise the funds, and who ought to contribute, have long been and continue to be vexed questions in England and in Scotland. Strange to say, Ireland seems to have taken the lead in an amicable solution of the problem. The system was abolished in Ireland in 1858, and a land assessment substituted for support of the roads. It may be held that nothing can be more fair than that he who uses a road should contribute to its support; but, on the other hand, the T. B. system is attended with immense expense. Besides the cost of erecting houses and gates, there is the cost of maintaining collectors, of whom it has been calculated that there are over 6000 employed in England and Scotland. Again, the opponents of the system, in support of their view, point to the fact that it has been eminently unsuccessful, there being over four millions of debt on the turnpike trusts of England, and two millions and a half on those of Scotland. In Scotland, the following counties have obtained abolition Acts—Dumfries, Haddington, Kirkcudbright, Wigton, Peebles, Aberdeen, Banff, Caithness, Cromarty, Elgin, Ross and Nairn. Orkney and Shetland, Sutherland, Argyll and Bute never had the T. B. system, having all along maintained their roads either by assessment or by state assistance. The other counties continue the T. B. and Statute-labour system. In England, under the Act of 1864, the turnpike roads are placed under the management and direction of certain bodies of trustees, who are usually named and appointed by the respective Acts of Parliament which are occasionally passed regarding the making and sustaining the particular roads specified in them. But various Acts of general application have been passed for the regulation of turnpike trusts throughout the kingdom. Under these Acts the following are exempt from toll—horses employed in husbandry, persons going to and from church on Sun-

day, clergymen engaged on parochial duty, officers conveying criminals, officers of the army, or soldiers or volunteers on duty, persons going and returning from Parliamentary elections. Any one claiming an exemption to which he is not entitled is liable to a penalty of £5. Toll-collectors refusing to give their name, or obstructing or injuring any passenger, or using scurrilous or abusive language, are liable to a penalty of £5. A table of tolls, in large and conspicuous characters, must be put up by the trustees. Mile-stone and direction-posts must also be erected. Any one defacing the same is liable to a penalty of £10.

Bar, Trial at. See **BAR**.

Baraba', a steppe of Asiatic Russia, between the rivers Obi and Irtysh, nearly 200,000 sq. miles in extent. In spring it is partly under vegetation, but in summer and winter it is covered with snow and salt lakes. It is sparsely inhabited by a nomadic race (the *Barabinszen*), descended from the Tartars of Turkestan. See Middendorff, *Die Baraba* (1870).

Baraco'a, a seaport on the N.E. coast of Cuba, in the vicinity of which is a singular mountain, called the Anvil of Baracoa.

Baraguay d'Hilliers, Louis, a distinguished French general of Napoleon I., was born at Paris, August 13, 1764. He served with distinction in the days of the republic, and in Italy with Bonaparte. He accompanied his great leader to Egypt, and, after much distinguished service, he accompanied him in 1812 to Russia. B. died at Berlin shortly after the retreat, December 1812.

Baraguay d'Hilliers, Achille, son of the above, was born at Paris, September 6, 1795. In 1832, after having served duly in the inferior military ranks, he was made governor in the military school of St Cyr, where he showed good practical capacity. He served for several campaigns in Algeria. After the revolution of 1848 he was chosen a member of the National Assembly. Adhering to Napoleon III., he was appointed to command the army of Paris in 1851. He distinguished himself both in the Crimean War and in the war with Austria in 1859. Previous to the latter he had been made a marshal of France. At the close of the Franco-Prussian war (1871) he was made president of the commission appointed to inquire into the causes of the disgraceful capitulations, particularly that of Bazaine at Metz, and in 1872 he was also president of the special council of war which tried General Cremer. He died 7th June 1878.

Barante', Amable Guillaume Prosper Brugiere, Baron de, a French statesman and author, born at Riom, in Auvergne, 10th June 1782, entered the service of the state in 1802, was a prefect under Napoleon, opposed the reactionary policy of the restoration, and zealously supported the government of Louis Philippe. He was French ambassador at Turin and at St Petersburg, but withdrew from public life after the revolution of 1848, and died in Paris, 23d November 1866. His chief literary performance, *Histoire des Ducs de Bourgogne de la Maison de Valois* (1824-26, 8th ed. 1858), is a learned and pictorial, but not very critical work. Other writings of B.'s are *Histoire de la Convention Nationale* (1851-53); *Histoire du Directoire de la République Française* (1855); *Le Parlement et la Fronde* (1859). He also translated Schiller's dramas into French.

Barb, a variety or breed of horses originally bred by the Moors of Barbary, and noted for their endurance, speed, and docility. The breed, introduced into Spain, has declined of late years.

Barbace'na, a city of Brazil, in a productive district of the province of Minas Geraes, about 150 miles N.W. of Rio. It stands at the height of 3500 feet above the sea, on the Sierra Martiquivera, and has a delightful climate. Pop. about 12,000, engaged in gold-mining and in the export of coffee and cotton to the capital.

Barba'does (Port. 'island of pines'), the most easterly of the Windward Islands, and next to Jamaica the richest of the British W. Indian possessions, in lat. 13° 4' N., long. 59° 37' W. It was discovered by the Spanish in the 15th c., and taken by the English in 1624. B. is the residence of the governor-general of the group, and the see of a bishop. It is cultivated

almost to the utmost limit of its resources, and the impossibility of greatly extending its productiveness has given rise to fears for the future provision of its rapidly increasing population. Sugar is the staple product, but there is also much cotton, wheat, and arrowroot. The climate is good; but there are frequent earthquakes, severe thunderstorms, and hurricanes of unusual violence. The island is of coral formation, and is nearly surrounded by reefs, there being no harbours. Bridgetown is the capital. The exports in 1872 amounted to £1,021,444; imports, £1,125,032. Area, 166 sq. miles; pop. (1871) 162,042, of whom 105,904 are black and 39,578 coloured. See Schomburgk's *History of B.* (Lond. 1848).

Barba'does Cherry, the common name in the W. Indies for the fruit of *Malpighia urens*, which is eaten. See MALPIGHIACEÆ.

Barba'does Gooseberry, the popular name in the W. Indies for *Pereskia aculea*, a plant of the order *Cactaceæ*, which yields a pleasant fruit used for making preserves.

Barba'does Leg, a name given to a disease which consists essentially of induration and thickening of the true skin, especially of the leg. The disease is met with occasionally in this country, but is common in the W. Indies, Barbadoes, China, Africa, &c., &c. It is a non-contagious disease, is not hereditary, and attacks rich and poor indiscriminately. Frequently the limb is swollen to double its natural size, so that the shape of the foot is quite obliterated, producing marked deformity, causing the limb to resemble the leg of an elephant; hence the disease is often called Elephantiasis of the Arabians. There is no very satisfactory treatment for this malady; when only one leg is implicated amputation has been practised sometimes with advantage. Benefit has also been derived from tying the main artery which supplies the lower limb, with the view of diminishing the nutrition of the leg. In the early stage, rest, elevation of the limb, and bandaging should be tried. This disease frequently attacks the scrotum and parts in that region, and cases are on record where the skin of the scrotum has so enlarged that when removed by the knife it weighed upwards of 50 lbs. The patient often does well after this operation.

Barbara, St., suffered martyrdom at Nicomedia in Bithynia under the Emperor Maximianus I., about A.D. 236, or according to others, at Heliopolis in 306. The legend of her life represents her as a lady of good family; and her education was carefully attended to by her father Dioscorus, who had a tower built for her in which she might pursue her studies undisturbed. She embraced Christianity, through the influence, it is said, of Origen. Her father was enraged at this, and handed her over to Martianus, the Roman governor, to deal with her according to law. Torture proving unavailing, Dioscorus offered to strike off his daughter's head. He did so, and was instantly struck with lightning. Hence St B. is prayed to in storms, and is the patron saint of artillery. Her image used to be placed on arsenals, powder-magazines, &c. The powder-room in a French ship of war is still called Sainte-Barbe. Her day in the Roman calendar is the 4th of December.

Barbaræa, a genus of Cruciferous plants. See CRESS.

Barbarelli, Giorgio. See GIORGIONE.

Barbarian (Gr. *barbaros*), originally one who could not speak Greek; then used especially of the Medes and Persians. Plato divided mankind into Hellenes and Barbarians. The origin of the word probably is, that the Greeks in imitating the language of a foreigner said *bar-bar*, meaning thereby that it was an unintelligible jingle. The secondary and contemptuous sense of *uncivilised, brutal, rude*, now in use, arose after the Persian war. The Romans were called barbarians till the Greek language was cultivated among them, and then the term was confined to the Teutonic and Scythian races. See Roth, *Über Sinn und Gebrauch des Namens Barbar* (1814).

Barbarossa. See FRIEDRICH I.

Barbarossa, the name given to two brothers, **Aruj** or **Haruj**, and **Khair Eddin**, sons of a renegade Greek, who were born in Mitylene towards the close of the 15th c., joined the Turkish corsairs, and soon became the scourge of the Mediterranean. Haruj, by treachery, made himself sultan of Algiers

in 1516, and was slain by the Spaniards in 1518. His brother succeeded him, and surrendered the sovereignty to the Porte in 1519. In 1532, becoming master of Tunis, he gave this up also to the Turks; but Tunis was retaken by the Emperor Charles V. in 1535, and was not incorporated with the Ottoman empire till 1575. Khair Eddin died at Constantinople in 1547.

Barbaroux, Charles Jean Marie, was born at Marseilles 6th March 1767. An advocate by profession, he represented Marseilles in the Constituent Assembly. At Paris he became attached to Brissot and Vergniaud, discussed with the minister Roland the scheme of a Southern Republic, and brought the Federates to Paris. In the Convention he boldly denounced the Septembriseurs, opposed the forced loan and the grain-tax, and supported the appeal to the people in the sentence passed on the king. The leader of the Girondists, he was proscribed 31st May 1793, and after wandering through France for a year, was captured at Bordeaux, and guillotined 25th June 1794. B.'s character stands high among the more moderate republicans: he was a bold and skilful speaker. Besides a memoir on extinct volcanoes at Toulon, he has left an essay on the influence of maritime war on commerce. Madame Roland mentions B.'s singular beauty. See *Mémoires de Ch. B. avec une Notice sur sa Vie*, by his son, M. Ogé B., and *Eclaircissements Historiques* by MM. Berville and Barrière (Par. 1822).

Barbary, the northern part of Africa, extending along the shores of the Mediterranean from the Atlantic to Egypt, and as far inland as the Desert of Sahara, or between 10° W. and 25° E. long., and 25° to 37° N. lat. It comprises Barca, Tripoli, Fezzan, Tunis, Algeria, and Morocco, with their dependencies, each of which is separately treated. The Atlas Mountains (q. v.) traverse a great part of B. in an irregular and double line, from Cape Geer on the Atlantic, to the coast of Tunis; while an offset, stretching northward, terminates at Ceuta. B. is naturally fertile, and in ancient times supported great and flourishing colonies, and furnished supplies for large conquering armies. In fact, Mauretania was once the granary of the world, and might still be so under proper rule.

The populations, exclusive of Europeans, are the Berbers (q. v.), called in Algeria, Kabyles, from whom B. takes its name; the Moors, Arabs, Jews, Turks, Kuluglis, and Negroes. Of these, the Moors are the residents in the towns; the Negroes are slaves, chiefly from Sudan; the Berbers inhabit the mountains and valleys of the Atlas; the Arabs are nomadic; the Kuluglis are children of Turks by native mothers. The Turks are dominant in Tunis and Tripoli; and the Jews prosecute lucrative callings in the towns. Pop. exclusive of Jews and Christians, estimated at over 11,000,000, all Mohammedan, with the exception of the Negroes, who are Pagans.

In Morocco, which is independent of Turkey, Arabic is the prevailing tongue, but Turkish is the official language in the regencies subject to the Porte. The *lingua communis* of commerce is Arabic.

The history of B. is of engrossing interest. Leaving out of view the narrative of Herodotus, with the exception of his notice of the Phœnician colonies, we know that after the third Punic War, when Carthage was sacked, the Romans gradually extended their dominion over the whole of Northern Africa. Numidia became theirs after the defeat of Jugurtha, and Mauretania after the defeat of Juba; while Cyrenaica, bequeathed to them by its King Apion at his death, B.C. 96, though at first declared free, was within thirty years also appropriated. Thus the Roman possessions in the N. of Africa, coextensive with the present B., received the benefits of Roman law and Roman civilisation. The remains are still numerous of the towns they built, while a natural consequence of Roman possession was the construction of aqueducts, amphitheatres, and other works for use or ornament.

Nowhere was Christianity promulgated with greater success than in Roman Africa, in which there were more than 160 dioceses. The decline of Roman power under Honorius, and the temptations to disturbance and revolt inseparable from a weak rule at such a distance from the central power, operated banefully on the African provinces. The Vandals, under Genseric, landed in Africa, A.D. 429, and their sway was a series of atrocities, till it was terminated by Belisarius in 533. In 647 the Arabs found the country an easy prey; before the close of the century they had annihilated what remained of the dominion

of the empires Eastern and Western; and with their usual policy proselytised the tribes by means of the sword. Dynasty succeeded dynasty with perplexing rapidity till near the close of the 13th c., when independent states began to arise. The expulsion of the Moors from Spain, not completely carried out till 1609, now began to be partially effected. Those expelled resorted to piracy, and formed settlements in the N. of Africa. Thence arose fierce contests between them and the Christian powers, especially Spain and Portugal, the greatest sufferers by their ravages. Morocco and Fez form an independent empire under the Sultan Muley Hassan; Algeria has been a French province since 1830; Tunis and Tripoli are nominally subject to the Porte, and Barca is claimed by Egypt.

Barbary Ape or **Magot** (*Macacus inuus*), a species of Macaque monkeys, included in the *Catarrhine* ('oblique-nosed') section of the order *Quadrumana*, and which inhabits the N. of Africa. This species is also found on the Rock of Gibraltar, and thus represents the only monkey found in Europe in a wild state at the present time. The tail in the B. A. is rudimentary; the muzzle slightly elongated; the facial angle is much higher than in the baboons, to which the B. A. is evidently allied; the face is destitute of hairs; the ears are prominent, and the eyes large. Cheek-pouches are present, and natal callosities are developed. These monkeys generally inhabit rocky places, and are gregarious in habits. They feed on fruits, but also appear to devour eggs and animal matter. They rarely assume the semierect posture, and progress chiefly on all-fours. They are intelligent, and can be taught tricks, if trained when young.

Bar, Bastard, the bar in heraldry is formed by two horizontal lines passing over the shield. The mark of bastardy is generally spoken of as the bar-sinister; but incorrectly so. A bend-sinister is also sometimes confounded with the B.-B., from which, however, it essentially differs. The real B.-B. is half of the scarp, which again is half of the bend-sinister. In England the B.-B. is called the baton-sinister. In the heraldry of our time it is not generally fully insisted on.

Barbastelle. See BAT.

Barbas'tro, a walled town in the province of Huesca, Spain, on the Vero, with a cathedral containing some of Antonio Gaceran's paintings. Pop. 6500.

Bar'bauld, Anna Letitia, a delightful writer for children, the daughter of the Rev. John Aiken, F.D., was born at Kibworth-Marcourt, Leicestershire, 20th June 1743. Studious in her habits, she early acquired considerable skill in Latin and Greek, and attained facility in writing English prose and verse. She produced a volume of poems in 1773, and in the same year published, in conjunction with her brother, a volume of *Miscellaneous Pieces in Prose*. In 1774 she married the Rev. Rochemont Barbauld, who shortly after opened a boarding-school for boys, in the superintendence of which he was ably assisted by his wife. Mrs B.'s *Hymns in Prose for Children, Early Lessons, &c.*, were written about this time in the interest, in the first instance, of her own pupils. She edited Akenside's *Pleasures of Imagination* in 1795, and in 1804 a selection from the *Spectator, Guardian, Tatler, &c.* She is also the editor of a *Collection of the British Novelists*. She died 9th March 1825. Her collected works, with Life by Lucy Aiken, were published Lond. 1825.

Barbed, in heraldry, pointed, as an arrow. The term is also applied to a heraldic rose with small green leaves, or barbs, surrounding it. *B. and crested* indicates that the comb and gills of a cock are tintured differently from the body. *Wattled and combed* is the old English phrase for the same thing.

Bar'bel (*Barbus vulgaris*), a genus of Teleostean fishes included in the *Malacopterus* division of the order, and belonging to the *Cyprinidae* or Carp family. This fish is one of the most familiar and most esteemed of fresh-water fishes. Its average length is two and a half or three feet, and it may attain a weight of 16 or 18 lbs. The name B. is derived from the filaments, known as *barbules*, which fringe the mouth, and which are supposed to subserve the sense of touch. These tentacles, possessed by other Cyprinoids also, are of great length in the Barbels, and are four in number. The upper jaw is longer than the lower jaw. The dorsal and anal fins are short; and the chief

ray in the dorsal fin is strong, and serrated or toothed. The flesh of the B., though coarser than that of the Carp, is still esteemed. It inhabits the deeper fresh-water rivers, and appears to feed on worms, crustaceans, and other small animals, which it obtains by groping in the mud of the bottom. Its general colour is a greenish-brown on the upper portion, and a yellowish-green on the sides; whilst the belly is white, and the tail purplish. The common B. is the only British species; the Binny or Nile B. (*B. Niloticus*) being a second species inhabiting the Nile, and attaining a weight of 60 or 70 lbs.

Barber. The business of a B. is of great antiquity; and in oriental countries it still flourishes. In England and France, again, private shaving has almost extinguished it, at least in cities, though in villages and country towns we still occasionally see swaying from the end of a pole in front of some little shop the brass basin with semicircular gap, indicating that the once-honoured profession is not wholly extinct, and recalling to us the deeds of the famous Don. In Spain the B.—like everything else in that queer fossilised country—is in nearly the same position that he was in three centuries ago. His premises are thronged morning and evening with customers, who, for the smallest possible consideration, enjoy the luxury of being shaved or trimmed under the soothing influence of the cigarette.

Barber Surgeon. In former times, in all countries, the business of a B. and that of a surgeon appear to have been regarded as having a natural affinity. In England, in the reign of Henry VIII., the surgeons and the barbers were incorporated into one company; but, strange to say, the very Act of Parliament which does this, draws a very sharp line between the functions which each is to discharge, and they are strictly prohibited from encroaching on each other's province. Barbers are not to draw teeth—surgeons are not to 'exercise the feat or craft of barbering or shaving.' Two centuries later, it was discovered that the functions in general of barbering and surgery were as independent of each other as the art of tooth-drawing is of that of shaving. Accordingly, on the preamble that the business of a B. was 'foreign to and independent of the practice of surgery,' an Act was passed in the 18th year of George II., dissolving the connection between the two bodies. In London, the barbers still possess the hall which they had in common with the surgeons before the disunion. It is in Monkwell Street, in the City.

Barberi'ni, a princely Roman family, originally called Tafari, but which took the name of B. from the Tuscan village from which it sprang. The noted poet and philosopher **Francesco da B.**, who wrote in the first half of the fourteenth century *Documenti d'Amore*, is supposed to have belonged to this family, which at an early period removed to Florence. **Antonio B.** (died at Florence 1571) had three sons, **Carlo**, **Ma'fco** (born 1568), who became pope under the title of Urban VIII., and **Antonio** (born 1569, died 1646), cardinal-librarian of the Church. The greatness and splendour of the house of B. dates from the time of Urban, who during his long pontificate of twenty-one years lost no opportunity of advancing the interests of his kinsmen. Of the three sons of his brother Carlo, the eldest, **Francesco** (born 1597), was elected a cardinal in 1623, possessed great influence with his uncle, and died, 1679, dean of the Sacred College. The second, **Taddeo**, married Anna Colonna of Paliano, great-granddaughter of the hero of Lepanto, and purchased from the elder Roman line of the Colonna the principality of Palestrina (anc. Præneste), along with other possessions of the Colonna family. The growing power and influence of the B. excited the jealousy of the Medici, Este, and Farnese families, and during the pontificate of Urban's successor, Innocent X., Taddeo and his brothers were forced to seek refuge in France, where the former died in 1647. **Antonio**, the third son (born 1608), was a restless character, fond of tournaments and display, but at the same time a patron of Latin and Italian poetry. In 1631 he too was made a cardinal, and after his retreat to France received from Louis XIII. the bishopric of Poitiers, and in 1657 the archbishopric of Rheims. Subsequently he was reconciled to the Pope, and returned to Italy, where he died at Remi in 1671. Through him the property of the Frangipani family came to the B. About a century after the death of Urban VIII., the male line of the B. became extinct. **Cornelia**, the grand-daughter of Taddeo and Anna, married in 1728 Giulio Cesare Colonna, Prince of Carbo-nano and Duke of Bassanello (died 1787), the grandson of that

Colonna who had sold Palestrina to the B.; and in this way the whole estates and wealth of the latter house once more reverted to the Colonna; but Giulio Cesare was compelled to add the name of B. to his own, and to leave unaltered the arms of the family. Of the sons of this marriage, the elder, **Urban** (born 1733), Prince of Carbognano, became the founder of the house of Colonna di Sciarra, represented at the present day by Prince Masfco, born in 1850; the younger, **Carlo**, obtained the B. and Colonna property, and died in 1819. He is represented by his grandson, **Don Enrico B.**, Prince of Palestrina, who has married into the famous family of the Orsini.

Barberino di Mugello, a town in the province of Florence, N. Italy, on the Sieve, a branch of the Arno, 15 miles N. of Florence, with a large manufacture of straw-hats. Near it is the royal villa Cafaggiola, the ancient residence of the Medicis. Pop. 9000.

Barberino di Val d'Elsa, a picturesque village about 14 miles from Florence, which has given name to the Barberini family (q. v.), who have here a palace.

Barberry, the English name for the *Berberis vulgaris*, a genus from which the natural order *Berberidaceæ* is named. It has bright green spiny leaves, yellow pendant clusters of flowers, and in autumn is adorned with racemes of bright scarlet berries. The bark, wood, and roots furnish a yellow dye; the fruit makes an agreeable preserve, but are much too acid for use when raw. The leaves are also acid. The popular idea that there is a connection between the red rust (*Æcidium Berberidis*) that affects the leaves of the B. and that which affects corn is correct, and farmers are therefore right in removing the B. from the vicinity of corn-fields. The species of B. are natives of the N. and S. temperate regions, and are much planted in shrubberies and gardens.



Barberry.

Barbet, a genus of Scansorial or Climbing birds, forming the sub-family Capitoninæ, included in the family of the Woodpeckers (*Picidae*). The bill in the barbets is stout, conical in shape, and more or less expanded at the sides. The base of the bill is provided with bristle-like filaments—from the presence of which the name B. has been derived. The tail is short and even, and the wings are also small. The species of the typical genus, *Capito*, inhabit South America. The *Bucconina*, or puff-birds, allied to the *Insectorial* kingfishers, and possessing the same arrangement of the toes—namely, two in front and two behind—as seen in Scansorial birds, are by some authors included under the designation of barbets. This latter family includes the genera monasa (*Barbacous*), Barbicans (*Pogonias*), and puff-birds (*Tomatia*). The first and last genera are found in South America; the barbicans occurring in India and Africa. The name puff-bird has been applied to this genus from the distended appearance of their plumage. They are solitary in habits.

Barbette (Fr.), in fortification, is a raised platform inside the parapet, of such a height that guns placed on it may be able to fire over the parapet, instead of through the embrasures.

Barbican, a watch-tower projecting before or rising above the gate of a castle or fortified town, from the Italian *barbaccine*, regarded by Wedgwood (*Dictionary of English Etymology*) as a corruption of the Persian *bâla khaneh*, an upper chamber. The best examples of the B. are to be seen in the town of Carcassonne; but Alnwick and Warwick in England also possess very perfect ones. The name is also applied to apertures in the wall of a fortress from which to fire upon the enemy.

Barbou, the name of a French family of printers, famous for the elegance and correctness of the works issued from their press. **Jean B.**

published at Lyon, in 1539, a valuable edition of Clement Marot. In 1580, his son, **Hugues B.**, published at Limoges, in *Italics*, a beautiful edition of Cicero's *Letters to Atticus*. **Joseph Gerard B.**, of the same family, commenced at Paris, in 1755, a 12mo issue of Latin classics, in continuation of a series begun in 1743 by Coustelier. In all, 76 volumes were published. In 1809, the stock and business of the Barbous were purchased by Auguste Delalain from the heirs of Hugues B., who had succeeded his uncle, Joseph Gerard, in 1789.



Barbican.

Barbour, or **Barber**, John, the earliest Scottish poet who used the English language, a contemporary of Chaucer, though somewhat older, was born probably a few years after the battle of Bannockburn, but first emerges into the light of history in 1357, when Edward III., King of England, grants a safe conduct to 'John B., Archdeacon of Aberdeen, with three scholars in his company, going to study at the University of Oxford' (*Rotuli Scotiae* i. h. 808). The same authority affirms that, in 1364, he was permitted to pass through England to 'study at Oxford, or elsewhere as he may think proper'; and in 1365 and 1368, he again obtained permission to pass through England to pursue his studies in France. B. was a member of the national council that, in 1357, secured the release of David II. from an English prison; was thrice an auditor of exchequer, viz., in 1372, 1382, and 1384, and received from Robert II., by a charter dated 5th December 1388, a grant of ten pounds sterling yearly for life, payable out of the customs of Aberdeen. The cessation of these payments enables us to fix the date of his death in 1395—probably the 13th of March, as on that day his memory was religiously celebrated in the cathedral of Aberdeen down to the Reformation.

The work that has given him an enduring place in Scottish literature is his poem entitled the *Brus*, a metrical chronicle in octosyllabic verse, narrating the career of the great Scottish king, from the murder of Cumyn in Dumfries to the death of Douglas in Spain on his way to Jerusalem with the heart of his master in a silver casket. From the first it was regarded as a history, not as a romance; and is the only record of the hero of Bannockburn that we possess. Both Wyntoun and Bower, the continuator of Fordun, plead the sufficiency of the *Brus* as a reason for passing over the story of the 'Seven Years War' of independence (1307-14). When the character and position of the author are considered, it will not be found difficult to believe that the poem is in the main a veracious account of Bruce's life from the unexpected disaster in Methven Wood to the brilliant day of Bannockburn. The style is simple and unaffected, but a fine patriotism and a chivalrous spirit animate the unrhymed verse. The dialect is the Lowland Scotch form of northern English, and the language is considerably purer than that of the *Canterbury Tales*. The best edition of the work is that edited by Cosmo Innes for the Spalding Club (1856). If we may trust Wyntoun, B. wrote another national poem on 'the Stewartis orygenale,' which has unfortunately perished.

Barbuda (Port. 'the island of the bearded men'), one of the Leeward Caribbees, 30 miles N. of Antigua. The castle is in 17° 33' N. lat., and 61° 43' W. long. Area, 75 sq. miles; and pop. (1871) 813. B. was taken possession of by Sir Thomas Warner in 1628, and in 1680 was given by the crown to the

Codrington family, to whom it still belongs. The agricultural operations are on a very limited scale; but stock is bred, and some corn, cotton, and tobacco are grown.

Barby, a town of Prussian Saxony, on the left bank of the Elbe, 15 miles S.E. of Magdeburg, with woollen and linen manufactures. It was formerly the seat of a large Hernnhuter colony, whose 'pädagogium' has been removed to Niesky, in Silesia. Pop. (1871) 5212, of whom 200 are Hernnhuters.

Bar'ca, a country of N. Africa, the eastern division of the regency of Tripoli, between the Gulf of Sidra and Egypt, lat. 26° to 33° N., and long. 20° to 25° E. Though much of it is barren, in the N. and E. is excellent pasturage, on which a superior breed of horses is fed, and in the vicinity of the streams the land is extremely fertile, producing in abundance rice, dates, figs, olives, palms, and saffron. The name B. was anciently applied only to a town, but under the Greek empire it was transferred to the provinces, and superseded the classical Cyrenaica (q. v.), with whose limits the country of B. nearly corresponds. The inhabitants are Arabs and Berbers, whose numbers are estimated at from 300,000 to 1,000,000.

Barcello'na Po'zzo di Got'to, a haven in the province of Messina, Sicily, 23 miles W.S.W. of Messina. It is divided by a small stream into two parts, and has a trade in corn, wine, oil, and fruit. Pop. of commune, 20,246.

Barcelo'na (Lat. *Barcino*), a strongly fortified city, and capital of a province of the same name, Spain, situated in a beautiful amphitheatre on the Mediterranean, midway between the rivers Llobregat and Besos, and distant from each about 4 miles. It is the chief trading and manufacturing city in Spain, the see of a bishop, and the seat of a university, with a splendid cathedral (1298), large public libraries, a fine stock-exchange, an arsenal, and a cannon-foundry. The town is composed of an old and new portion, separated by a picturesque old river-bed (the *Rambla*), now a garden and promenade. There is also a maritime suburb (*Barceloneta*), the *corso* of the famous B. carnival, with 10,000 inhabitants. It has a large harbour, and is defended by a citadel, and by the fortress of Montjuich or Mont-juy, and carries on a large import trade, chiefly in raw cotton, coal, cod-fish, coffee, cocoa, sugar, rum, hides, iron, timber, and petroleum. The principal manufactures are cottons, woollens, fancy silks, lace, and firearms. In 1875 the harbour was extended, and its entrance improved. For several years return cargoes have been difficult to obtain at the port, and trade has suffered generally from the Carlist war. The imports amounted in 1874 to £1,943,310, and the exports to some £300,000. Pop. (1878) 256,195. B. owes its origin to the Carthaginians, perhaps to Hamilcar *Barcas*, father of Hannibal, from whom the name *Barcino*, by which it was known to the Romans, is thought to be derived. In the 4th c. the modern form of the name first appears; but by the Arabs it was called *Barsanana*. Ecclesiastical councils were held here in 504, 599, 906, and 1064. During the dark ages B. frequently changed its rulers, and suffered severely from the devastations of the Arabs; but under a dynasty of hereditary counts it grew and flourished in the 11th and 12th centuries. At this time it was the 'lord and terror of the Mediterranean,' sharing with Italy the rich trade of the East, and occupying a foremost place as a centre of learning, art, and luxury. By the marriage of Count Raymond Berengar IV. with the daughter of Ramiro II., King of Aragon, in 1137, B., together with the whole of Catalonia, was joined to the crown of Aragon. In 1493 Ferdinand and Isabella here welcomed Columbus on his return from the New World. B. threw itself into the arms of France in 1640, to escape the taxes and tyranny of Philip IV., but again, in the War of Succession, it espoused the Austrian cause, and was taken by Lord Peterborough in 1705. It was again captured in 1714 by the Duke of Berwick, after a murderous siege, and in 1808, through a treacherous trick by Napoleon, who declared that it 'could not be taken in fair war with less than 80,000 men.' The Treaty of Paris restored it to Spain in 1814, and of late years it has displayed an occasionally zealous interest in the Carlist war. The province of B. is a modern division of Old Catalonia, the most cultivated, fertile, and populous part of España. Area, 19,824 sq. miles; pop. (1870) 762,555.

Barcelo'na, earlier *Naveva Barcelona*, a seaport of Venezuela, at the mouth of the Aragua, on an open bay of the

Caribbean Sea, 165 miles E. of Caracas. It has considerable trade, chiefly in maize, coffee, and indigo. Pop. (1873) 7674. B. was founded in 1671, thirty-three years after the establishment of the first town of this name at the foot of the Cerro-Santo mountains, and first rose into importance about the close of the 18th c., through a smuggling trade carried on with the W. Indies.

Bar'clay, Alexander, was born (probably in Scotland) in 1476, studied at one of the English universities, became successively a priest at St Mary Ottery's, Devonshire, a Benedictine monk at Ely, the vicar of Great Baddow (Essex) and Wokey (Somerset), and died in 1552. He was patronised by the Duke of Norfolk, and was possibly a friend of Dean Colet. His chief work is *The Shyp of Follys* (Pynson, 1509), adapted and translated from the *Narrenschiff* of Sebastian Brandt, of Basel, the most popular satire of society in Germany, Switzerland, and France at the end of the 15th c. B.'s version is remarkable (though directly translated from Latin and French) for the simplicity of its English, and the absence of Latin forms, and is a valuable illustration of English manners and morals, *temp.* Henry VII. and VIII. B.'s *Égloges* are partly a translation of the *Miseries of Courtiers* by Aeneas Silvius (Pope Pius II.). Besides some prose lives of saints, a translation of Sallust's *Jugurthine War* entitled *Cronycle compiled by Sallust*, and an *Introductory to Write and Pronounce Frenche* (a work important to philologists, as one of the signs that English pronunciation of Latin was moulded on the French), B. wrote *The Myrrour of Good Manners*, a translation from the Latin elegiac of Mancinus on the four cardinal virtues. B. is distinguished among early satirists for the purity of his thoughts. Though a good Catholic, he lashes the vices of the Church, and is especially severe upon the court. The woodcuts published with *The Shyp of Follys* from the German original are of great interest (see edition by Jamieson, Paterson, Edinb. 1874). Those of the fools 'that *cras cras* singeth with the crow,' 'that will build before he count the cost,' 'that weigheth in one balance the heaven and earth, to know the heaviest,' are among the best. The satire on Predestination is singularly bold.

Bard'clay, John, M.D., anatomist and physiologist, born December 10, 1758, at Cairn, in Perthshire, studied theology at St Andrews, but after receiving licence as a preacher, commenced the study of medicine at the University of Edinburgh, from which he obtained the degree of M.D. in 1796. He gave private lectures in Edinburgh on anatomy; wrote the article *Physiology* for the third edition of the *Encyclopædia Britannica*; published in 1803 *A New Anatomical Nomenclature*, followed in 1812 by a description of the *Arteries of the Human Body*, and in 1825 by an *An Inquiry into the Opinions, Ancient and Modern, concerning Life and Organisation*. He died, August 21, 1826, bequeathing to the Edinburgh College of Surgeons his valuable collection of specimens in comparative anatomy.

Bar'clay, John, the son of William B., a Scottish professor of civil law at Pont-à-Mousson and Angers, was born in the former place, 28th January 1582. Educated in the Jesuit College, he with difficulty escaped being pressed into the service of the order. Going with his father to London, he produced in 1603 and 1606 two parts of his *Euphormionis Satyricon*, dedicated to James I. and Lord Salisbury. This attacks the Jesuits, and gives curious details about England. In 1612 he defended against Bellarmine the orthodoxy of his father, which was thought to have been compromised by a work on *Regia Potestas*. In 1614 appeared the *Icon Animorum* (translated into English by Thomas May), which analyses the genius and manners of European nations, giving a high place to the Scotch. Leaving England in 1615, he settled the following year in Rome, where he composed his romance of *Argenis*, which has been translated into most European languages (into English by Le Grets and May). It describes under fictitious names the secret politics of the time, the monarchs of England, France, and Spain, the Guises, Pope Urban, and John Calvin being mentioned. B. died at Rome, 12th August 1621.

Bard'clay, Robert, son of Colonel David B. of Urie, a volunteer under Gustavus Adolphus, and Katherine Gordon, was born at Gordonstown, Morayshire, 23d December 1648. Sent for education to his uncle Robert, the Catholic rector of the Scots College, Paris, he returned to Scotland in 1664, and soon after both he and his father and Jaffray joined the Society of Friends. In 1670 he married Christian Molleson, and in the

same year published at Aberdeen *Truth Cleared of Calumnies*, in reply to Mitchell's *Dialogue between a Quaker and a Stable Christian*, which was followed by *William Mitchell Unmasked*. In 1673 appeared his *Catechism and Confession of Faith*, followed by the *Theses Theologicae*, in support of the fifteen propositions of the Friends. For some time he had been exposed to persecution by the authorities of Aberdeen, his marriage having been declared unlawful, and the absurd Acts against conventicles being enforced. B. startled Aberdeen by walking through its streets in sackcloth and ashes. This he was commanded to do by the Lord. In 1675 he finished his famous *Apology for the True Christian Divinity*, dedicated to Charles II., whom he exhorts by the remembrance of his own exile to protect Quakers. It was published in Latin and English, and is an eloquent and learned statement of the Quaker position. Like the *Institution* of Calvin, it is read and quoted to the present day. His *Anarchy of the Ranters* (1676), republished as *Treatise on Christian Discipline* (1771), deals with the outward ceremonies of the sect. B. accompanied Penn and Fox to Holland, and was a good deal in London. In 1679 Charles II. granted him a barony charter of Urie, and in 1682 he was offered the governorship of E. Jersey (New England). He died at Ury, 30th October 1690. Modern Quakers think that B.'s works 'lead to Rationalism.' It is not the dogmatic contents, but the spiritual religion, of the *Apology* which makes it so powerful. Even the bigoted Brown of Wamphray admits that 'the serpentine venom' of B. is 'sugared over with fair speeches.' This, however, only makes Brown the more angry with the 'hellish neopaganism' of this 'devil in Samuel's mantle.' The collected folio edition of B.'s works (1692) is known as *Truth Triumphant through the Spiritual Warfare, &c., of that able and faithful servant of Jesus Christ, Robert B.* A 13th edition of the *Apology* was published at Manchester in 1869. Particulars of B.'s life will be found in the *Diary of Provost Jaffray of Aberdeen*, and in the unpublished *Reliquia Barclaiana*, lithographed by Walter & Bailey, Lond. 1870.

Barclay de Tolly, Michael, Prince, a celebrated Russian general of the 18th and early part of the 19th c., was a descendant of the Scotch family to which B. the poet and B. the Quaker champion both belonged, and two of the branches of which had settled in Mecklenburg and Livonia respectively. Born in Livonia in 1759, he was trained to arms by his uncle and by Brigadier Van Vermoulen, a veteran of the Seven Years' War, and fought with great bravery in the Russian ranks against Turkey in 1788 and 1789, against Sweden in 1790, and against Poland in 1792 and 1794. He played an important part in the wars against Napoleon, in spite of the hatred felt towards him by the Russian national party, who called him a German; he commanded the advanced guard of Benningsen's army at Pultusk; lost an arm at Eylau, and was minister to the Emperor Alexander 1810-13. Losing the battle of Smolensk in 1812, he had to give up the chief command of the army to Kutusow; but, on the death of the latter, resumed it, holding it at the battles of Bautzen, Dresden, Culm, and Leipzig. Although on Napoleon's return from Elba he was not able to take an active part in the hostilities which ensued, he acted as commander-in-chief of the Russian armies in France, and was made a prince, receiving also from Louis XVIII. the cross of Commander of the Order of St Louis. He died at Insternburg in Prussia, April 25, 1818, while on his way, for the benefit of his health, to the Bohemian baths. He has the reputation of being at once one of the bravest, the most skillful, and the most humane commanders of his time.

Barclay and Perkins' Brewery, one of the most extensive industrial establishments in Great Britain, and, after that of Messrs Truman, Hanbury, Buxton, & Co., the largest brewery in London or the world, is situated in Park Street, Southwark, covers an area of eleven acres, and consumes in brewing 600 quarters of malt daily. One of the numerous vats contains 3500 barrels of porter, which at selling price would yield £9000. The water used in brewing is taken from the Thames at Ditton, and costs £2000. About 200 horses, splendid specimens, chiefly of the Flanders breed, are employed in carting the beer. The work was founded by Mr Thrale, the friend of Dr Johnson, and on his death it was sold by Johnson and another executor on behalf of Mrs Thrale to Messrs B. & P. for £135,000. On the occasion Johnson said characteristically—'We are not here to

sell a parcel of boilers and vats, but the potentiality of growing rich beyond the dreams of avarice!'

Bar-Coch'ba, Simon, the leader of the Jews in their revolt against the Romans under Hadrian, which broke out soon after the Emperor's second return from Syria. Simon applying to himself the prophecy of Balaam, 'There shall come a star out of Jacob' (Num. xxiv. 17), assumed the name of Bar-Coch'ba (son of the star), and about 132 A.D. took Jerusalem from the Romans, and had coins struck in his own name. The Jews soon possessed 50 towns and nearly 1000 villages; but Julius Severus, Hadrian's general, arriving from Britain, retook Jerusalem, and the last stronghold of the Jews, Bether, was stormed in August 135 A.D. On this day B. fell, and his head was carried to the Roman camp. This was the last great struggle of the Jews, and from it dates their final dispersion over the earth.

Bard, the name given by various Celtic peoples to a class of literary men or public singers, having a defined *status* with certain duties and privileges. Their precise relation to the priest class on the one hand and to the judges on the other is doubtful, at least in the archaic times, but there is no doubt that they were gradually formed into a separate class, whose function was to recite on great occasions in peace and in war, religious and secular, and which long survived the decay of the Celtic religions with which they were connected by origin. Feasts, battles, treaties, funerals, popular assemblies, these were the times at which the B. spoke and sang; and, if they were the depositaries of the national music and verse, they must also have been intrusted with the great mass of oral tradition. A very large collection of Welsh bardic fragments from manuscripts chiefly of uncertain date has been made in the *Myrnyrian Archaeology of Wales* (2d edit. 1870). These are divided into the earlier poetry before the beginning of the 14th c., when the change of political conditions, through the annexation of 1282, took away the ancient patronage of the B., and the poetry of the 14th, 15th, and 16th c. Prominent among the former are the *Gododin*, or battle of Cattraeth, by Aneurin (510-560), the historical, mystical, satirical pieces and odes and elegies of Taliesin (520-570), the moral triplets of Llywarch Hen (550-640), and the *Oracles* by Myrddin (530-600). In the 12th c. Gwalchmai, Cynddelw, and Llyward ab Llywelyn, composing panegyrics and odes to historical persons and on historical events, are the principal figures. In the 13th c. the elegies of Bledynn Vardd, Prydydd Bychan, and Gruffydd ab Maredudd (who also treats a number of Christian subjects) are important. In what is called the Venedotian or N. Wales code of the laws of Howel Dda, which is assigned to the 11th c., in the book treating of the laws of the court, the position of the king's bard (Teulwr) is very clearly defined, although he has sunk in dignity beneath, not the priest and judge merely, but even the chief falconer and groom. At the feast he is to sing first of God, then of the king; at the division of spoil he is to sing of the British monarchy. His 'saraad' (or hurt-money) and 'worth' (death-money) are much the same as those of the higher officers. Among the prose remains of the B. may be mentioned the moral aphorisms of Catoc the Wise, the didactics of Bardd Gläs o'r Gadair, the Blue Bard of the Chair, a contemporary of Alfred, and the triads and institutes of the B. on various subjects. The very interesting relics of ancient music of Wales (said to have been settled by a congress of B. before Gruffydd ab Cynan in 1040), are said to show, from there being no fundamental notes added to the bass chords, and from such technical terms as 'the thumb choke,' 'the trill of the thumb,' 'the shake of the little finger,' that the music was meant for the crwth, a sort of flat violin of six strings, which might be tuned as low as the modern violoncello, and might be used as a bass to the harp. The Welsh kings presided at the Eisteddvod where the B. competed for the silver harp, and the rules of harmony were discussed. After the annexation the Eisteddvod was permitted by royal commission: it is now supported by the Metropolitan Cambrian Institution. As regards Ireland, we know from the Brehon laws that judicature and poetry were the most honourable professions, to which certain privileges were attached. Their close connection is seen in the fact that Dubthach, royal poet of the 5th c., is said to have given the award which forms the connecting link between pre-Christian and post-Christian law. The Irish B., who were pro-

bably hereditary, were like the Welsh historians and heralds: they are spoken of in the *Leabhar na Ccirt* as giving legal advice and instruction in science. The common division is into (1) the *Filhedha*, who sang of religion and war (*Rosg Catha*), &c.; (2) the *Breitheamhinn*, or Brehons, who recited the laws; (3) the *Seanachaidhe*, who kept annals and genealogies. Fergus Fionbell, the sweet-voiced, and Torna Eigeas, the learned, are noted among heathen B.: Amergin, Adamnan, Maolmore, and Flann among the later Christian B. The sacred odes and hymns of Donogh O'Daly, abbot of Boyle in the 13th c., and the crop of political B. during the oppression of Elizabeth, should be noticed. Carolan, a miscellaneous poet, who died in 1737, has been called the last of the B. Amatory sentiment marks the later Irish B. The English government felt the power of these B., and the statute of Kilkenny (1327) was intended to destroy it. The B. used the harp and the cruit, the most common type of ancient verse being a quatrain with seven syllables to the line. The 'Duans' of Scotland were probably sung by a class of B. attached to the clans. It should be added that, although the existence of the four great Welsh B. of the 6th c. has been established, there is still controversy as to the genuineness of many pieces ascribed to them, the four oldest collections of manuscript, viz., the black book of Carmarthen, the book of Aneurin, the book of Taliessin, and the red book of Hergerst, being all later than 1150. Mr Skene, the editor of selections from these books, observes that a large proportion of the historical poems belongs to Cymry, e.g., the *Cyvoesi Myrddin*, an historical dialogue between Myrddin and his sister Gwendydd, composed partly in the reign of Cadwallader, the son of Cadwallawn. Under these monarchs (in the end of the 6th and the first half of the 7th c.) a consolidation of bardic tradition took place, and when the kingdom of y Gogledd (the north) was destroyed by the Angles, the history of Nennius (circa 738) was carried to Wales, and with the introduction of the Armorican legends led to the composition of the *Bruts*. Mr Skene also calls attention to the revival of bardism on the return to Wales of the lawful princes Rhys ap Tewdwr and Prydydd Mawr at the end of the 11th c. (*The Four Ancient Books of Wales*, vol. i. 1870). So late as the end of last c., Mr Edward Williams, calling himself Iolo Morganwg, claimed the honours and titles of the Glamorgan bard's chair, one of four chairs which were said to have existed at one time. We may add the classification of B. adopted in Toland's *History of the Druids*: 1. *Privardh*, or prince of learning; 2. *Posvardh*, or Prydyddion, registrar and teacher of learning; 3. *Arruyvardh*, ensign, genealogist, or herald. The Bardh I'elyn was the doctor of players on the harp. Poets were divided into Pruddudh, who treated of nations, princes, and nobles; Tevlwyr, who dealt in jests and pastimes; Clerwyr, who recited caricatures among the lower orders. The last may perhaps be the 'vates' mentioned by Strabo, and the 'cubages' mentioned by Ammianus Marcellinus. The Ollamh was a graduate in poetry. A tradition exists of a parliament at Drumcat, in Derry, which (A.D. 597) ordained every king and lord of a cantred to keep a poet free, and to give him land.

Bardessanes (Bar-Deisan), born in Edessa 154 A.D., founded, towards the close of the 2d c., a sect of Gnostics known as Bardesanists. He first embraced the doctrines of Valentinus the Egyptian, which he afterwards abjured, though ultimately he was partially reconciled to them. His *Gnosis* differed considerably from the old Syrian Gnosticism, for he regarded evil as arising from matter acting temporarily on spirit. He held further that Christ had no material body, but only the semblance of one, there being no resurrection of the body. Like some modern Christian sectaries, he disseminated his views by means of hymns, of which he is reckoned the first Syriac writer. His adherents were always, though somewhat loosely, in connection with the orthodox Church. Hahn's *B. Gnosticus Lyrorum Primus Hymnologus* (Leips. 1819); Marx's *B. von Edessa* (1864); and Hülgenfeld (1865).

Bar'di, a small town in the province of Piacenza, Italy, situated on the Ceno, 31 miles W.S.W. from Parma. A castle, erected in the 9th c., upon a neighbouring hill, commands the town. B. was also formerly the name of a duchy. Pop. some 3000.

Barefooted (Lat. *discalceati*, shoeless), applied to certain

monks and nuns who go with their feet uncovered, either constantly, like the Alcantarines, or for a fixed portion of the year, like the nuns of our Lady of Calvary. Other *discalceati* wear sandals instead of shoes. They are not a separate order, but are to be found among most of the orders, as ascetics of grades more or less austere. The most probable account of the motive of their origin is that which attributes it to Christ's command to the disciples (Matt. x. 10; Luke x. 4).

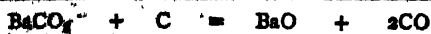
Barèges (Fr. *crête de Barèges*), a mixture of silk and worsted, or worsted and cotton, used for women's dresses. It is a slight fabric for summer wear, of various colours. The best is produced in France, not at the place of the same name, but at *Bagnères de Bigorre*, about 16 miles distant.

Barèges-les-Bains, a celebrated watering-place of the Hautes Pyrénées, France, in the Bastan valley, with eight alkaline and sulphurous springs, from 100° to 133° F., of great efficacy in the cure of rheumatism, wounds, and stiffness of joints, and scrofulous complaints. It is much visited during summer being one of the best points from which to explore the Pyrenees, but is almost entirely deserted in winter. B. is in the commune of Betponey, which in 1872 had a pop. of 586.

Barcill'y (*Barcili*), the chief town in the district of the same name, and capital of Rohilkund, N.W. provinces, British India, on the Rangunga river, 788 miles by rail N.W. of Calcutta, and 152 E. of Delhi. It has extensive cantonments, and a considerable trade in grain, cotton, and sugar. The chief buildings are the recently erected fort, two mosques, the Government college, and an English church. At the Mutiny all the European inhabitants of B. were put to death (31st May 1857), except the ladies and children, who had been previously conveyed to Nynce Tal. Pop. (1872) 105,649. The district of B. has an area of 2982 sq. miles, and pop. (1872) 1,506,801.

Barère de Vieuzac, Bertrand, one of the chief orators during the worst excesses of the French Revolution, was born at Tarbes, 10th September 1755, and trained to the profession of an advocate. He became, however, first a member of the National Assembly, and subsequently of the National Convention, in 1792. Originally a Girondin, he seceded to the Mountain; and although naturally of a by no means cruel nature, the moment he tasted blood he craved for more. He was President of the Convention when sentence of death was passed on Louis XVI., and his florid harangues did almost as much as Robespierre's fanaticism to supply the guillotine with victims. Although he was far-seeing and cunning enough to desert Robespierre before his fall, he was one of those condemned to transportation after that event. He shared, however, in the amnesty of the 18th Brumaire, and was even employed as a writer of reports and pamphlets, chiefly against Great Britain, by the First Napoleon. During the Hundred Days of 1815, he was a deputy to the Chamber, but was banished after the Bourbon restoration, returning, however, to his country in 1832, and acting as a member of the administration of the Department of Hautes-Pyrénées till 1840. His death took place January 14, 1841. Besides his political pamphlets, B. translated a good deal of prose and poetry from English and Italian. His *Mémoires* were published in 4 vols., 1842, under the editorship of M. Hippolyte Carnot. B. has been severely branded by English historians and critics of the Revolutionary period, especially by Carlyle and Macaulay; the latter, in one of his essays, saying that 'B. approached nearer than any person mentioned in history or fiction, whether man or devil, to the idea of consummate and universal depravity.' Although Macaulay's criticism may be too trenchant, there can be no doubt that B. was one of the most mendacious, cowardly, and sensual of the Terrorists.

Baretti, Joseph, known chiefly as the friend of Samuel Johnson, and tutor in the family of Mr Thrale, was born in Turin, 1716. He became a teacher of languages in England in 1750, and at that time was introduced to those persons, his acquaintance with whom has gained him a certain immortality in the pages of Boswell. B. was an industrious writer, publishing, among other works, an Italian dictionary, and *Travels through France, Spain, Portugal, and Italy* (4 vols.). In 1780 he visited Italy, and published a journal at Venice called the *Frusta Litteraria* ('Literary Scourge'), which involved him in some trouble with the authorities. Having stabbed a man with a penknife in a street brawl in London, he was tried for murder,



Witherite. Carbon. Baryta. Carbonic oxide.

It is a grey powder, having a sharp alkaline taste, and a great affinity for water and carbonic acid—in both respects resembling unslaked lime—with which indeed it is perfectly analogous. It combines with water with so much energy that the mass may become red-hot; the resulting compound is the hydrate of B. or caustic baryta, BaH_2O_2 , a crystalline substance soluble in cold, but more readily in hot water. Its solution has an alkaline taste and reaction, and is of great use to the chemist as a test for carbonic acid; the smallest trace of that substance causing a milky precipitate of carbonate of B. It is also useful in preparing other bases from their sulphates.

The soluble salts of B. are extremely hurtful to the economy, acting as cumulative poisons. In the arts, sulphate of baryta is used to adulterate white paints (*permanent white*), and the carbonate is employed as a pigment, and in the manufacture of certain kinds of glass. All the soluble salts of B. are precipitated by sulphuric acid and solutions of sulphates, insoluble sulphate of B. being formed.

Bark. See BARQUE.

Bark (*cortex*) surrounds the whole axis of plants, and is most distinctly seen in trees and shrubs, in which it attains a considerable thickness. In early life it is entirely cellular, but later in life the innermost layer (or *liber*) becomes fibrous and vascular. From within outwards the bark is composed of four layers—viz., (1) The *liber*, *bast layer*, or *endophloeum*, composed of layers of branching fibres which frequently separate from each, owing to the interposition of layers of cellular tissue. On the inner side of it are usually developed some milk (*lactiferous*) vessels. In an exogenous stem one layer of the endophloeum is developed for every year's growth of the tree. The *liber* of the lime-tree (*Tilia Europaea*) forms Russia matting, that of the sack-tree of Coorg (*Antiaris saccidora*) is used to form bags, mats, &c. Cuba bast is the *liber* of *Paritium datum*, while flax is the *liber* of *Linum usitatissimum*, that of *Cannibis sativa*, hemp, &c. (2) The *mesophloeum*, or green layer; it is made up of superimposed layers of thin-walled globular or polyhedral cells, filled with Chlorophyll (q. v.), and has usually a number of interspaces formed by the loose union of the cells. It sometimes contains vessel-shaped lacunæ containing resin—e.g., in pines, junipers, and various other coniferæ. (3) The *epithelium*, or corky layer, which has no chlorophyll in the cellulose tissue composing it. The cells are thin-walled, and are rectangular and elongated in a horizontal direction, being by these characters distinguished from those of the mesophloeum. It is also distinguished by remaining alive for a short time only, in wanting sap, and in its cells containing air. Unlike cellulose, it does not turn blue under the action of iodine and sulphuric acid. The *suberous* or corky layer is largely developed in the B. of some trees, and notably in the cork-oak (*Quercus suber*), from which it is stripped to supply the Cork of commerce (q. v.). (4) Lastly, there is the general integument of the plant, or *Epidermis* (q. v.). In annual dicotyledons the B. is more simple in structure, and varies in some slight particulars. In the stems of monocotyledons (*endogenous* Stems—q. v.), the B. is composed of (1) an epidermis; (2) cellular tissue; (3) bundles of fibrous vessels, which are sometimes wanting, but never forming, as in the *liber* of dicotyledons, leaf-like layers (hence the name *liber*, from the Latin for a book). The B. in endogenous stems is firmly attached to the wood by means of the woody bundles which arch outwards from the interior of the stem. The B. of the root of dicotyledons has all the anatomical elements arranged in the same order as in the stem. It differs, however, in the size of the fibres of the *liber*, in the 'greater development which the cellular envelope often attains in the root, particularly of herbaceous plants, and in the stem possessing a much greater development of the suberous layers of the B.' (Brown). There is no chlorophyll in the bark except in that of aerial roots.

Bark, in medicine. From the bark of trees many valuable medicines are obtained. These are used as powders, infusions, and tinctures. They are chiefly used as bitter tonics. Many of them will be found under separate headings. The most important are Cinchona B., sometimes called Peruvian or

Jesuits' B.; Cusparia B., called Angostura B.; Strychnos or Nux vomica B., called false Angostura B.; Cascarella B., Winter's B., &c. Some are used chiefly for aromatic properties as Cinamon and Cassia B., others for their astringency alone, as Oak B. Many of them owe their activity to the alkaloids contained in them. The most important B. is Cinchona B., from which quinine is obtained.

Bark, Tanning. The barks of a great variety of trees yield tannin in sufficient proportion to make them available for the use of tanners, but a few only are of such importance as to render them objects of international commerce and general staples of the tanning industry. The bark of various species of oak is specially rich in tannin, and the common oak, *Quercus robur*, is the chief source of native British T. B. Oak bark is also imported in large quantities from various Continental countries for use in tanning, and the inner bark of the cork oak, *Quercus suber*, is brought for the same purpose from the S. of Europe. Quercitron bark, *Quercus tinctoria*, is a valuable tanning and dyeing bark, imported from N. America, from whence also comes the bark of the hemlock spruce, *Abies Canadensis*, now one of the most extensively used tanning barks. Under the name of mimosa bark or wattle bark, the Australian Colonies export for tanners the barks of several species of *Acacia*, chiefly *A. melanoxylon*. The bark of the common larch, *Larix Europæa*, is also largely employed in tanning, and among others less generally employed, there may be noted mangrove bark, *Rhizophora mangle*, from the E. and W. Indies, and the bark of the sweet or Spanish chestnut, *Castanea vesca*. The imports of tanning barks into Great Britain during 1873 amounted to 467,515 tons, of a value of £176,997, but much of this is used by dyers as well as by tanners.

Bark Beetle, or **Bark Chafer**, the popular name applied to various species of *Coleoptera* or beetles, which have the habit of eating and eroding wood. Thus the members of the tribe *Xylophagi* ('wood-eaters'), represented by the *Tomicus typographus*, the *Hylurgus piniperda*, &c., are notable as destroying wood; the larvæ, as well as the perfect forms of these species, boring into the trees of the German pine-forests, and causing vast destruction therein. In 1783, these insects thus destroyed one and a half millions of trees in the Hartz Forest; and prayers are offered up by the clergy for the limitation of their ravages. The *Scolytus destructor* of Britain similarly destroys elm-trees.

Bark Stove is a stove in which there is a bed of tanner's bark, or some such substance, for the purpose of producing by fermentation a moist heat, which is necessary for the successful cultivation of tropical plants. In many instances, however, the B. S. has been superseded by pipes or tanks filled with hot water, and laid beneath the bed in which the plants are placed.

Barkal, or **Jeb'el Barkal**, the name given to an isolated sandstone rock, 400 feet high, and about two miles in circumference, situated near the right bank of the Nile, in Nubia, lat. 18° 31' N., long 31° 46' E. Near B. are the remains of several splendid temples, and the supposed site of the ancient city of Napata. In 1832 Lord Prudhoe brought hence the two red granite lions now in the Egyptian Room of the British Museum.

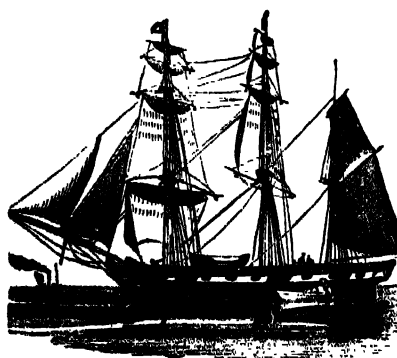
Barker, Edmund Henry, a philologist of some note, was born at Holmlym vicarage, in Yorkshire, December 22, 1788, and was a student at Trinity College, Cambridge. He made numerous contributions to philological journals, translated some works of German philologists, edited several Latin classics, and published his *Classical Recreations* (1 vol. 1812). In 1816, he undertook for Valpy a revision of Stephens's *Thesaurus Lingua Græca*, which was completed in 13 vols. (1816–28). The work was severely criticised by Bishop Blomfield in the *Quarterly Review* (No. 44), and this called forth B.'s *Aristarchus Anti-Blomfieldianus*. His *Parriana* (2 vols.) consists of ill-arranged but interesting notices of the opinions, controversies, and peculiarities of his friend Dr Parr, contributed from many sources. B. died in London, 21st March 1839. Porson's remark gives B. the chance of a painful immortality: 'Sir, you have read a great deal, you have thought very little, and you know nothing.'

Barker's Mill is a kind of water-wheel, invented towards the close of the 17th c. by Dr Barker, the action of which depends upon the law that, when a fluid is issuing from a vessel,

a pressure is applied to the internal side of the vessel opposite the opening proportional to the velocity of emission, thus tending to push the whole vessel backwards. In its simplest form B. M. consists of a J-shaped tube, the cross-piece being below. The lower extremity turns on a pivot, the upper is fixed to a wheel, which is capable of setting in motion other wheels, shanks, &c. If the tube were filled with water, it would be in equilibrium, provided there were no outlet. If, however, two openings are made, looking in opposite directions, one at each extremity of the cross-piece, the momentum of the issuing water, which depends upon the height of the column of water in the vertical portion of the tube, reacts upon the cross-tube, and pushes the whole round in the opposite direction. There is found experimentally to be considerable loss of energy due to the sudden change in direction of the water. This is to a certain extent obviated by making the arms curved instead of straight.

Bar'king, a market-town in Essex, five miles N. E. of Greenwich, on the left bank of the Roding, a little above its junction with the Thames. It has a trade in potatoes and vegetables, coal and timber. Pop. (1871) 5766. The place is famous for the ruins of a formerly large and rich abbey and nunnery, the abbess of which was a baroness in virtue of her office. It was built in 677 A.D. by St Erkenwald, Bishop of London; burned by the Danes in 870; and rebuilt by King Edgar in the middle of the 10th c.

Bark, or **Barque**, a nautical term meaning strictly a three-



Barque.

masted vessel without mizzen topsail, or whose mizzen sails are fore-and-aft instead of being square. But the term is sometimes applied simply to a small ship, at other times, to a broad-sterned vessel without a figure-head.

Barlaam and Josaphat, a religious romance which had its origin in the Eastern Church, but which attained its greatest popularity in the W. of Europe,

where it appeared in a Latin version early in the middle ages. It professes to be a history of the conversion of an Indian prince, Josaphat, by an Asiatic anchorite, Barlaam, and is obviously composed in the interest of Christianity. No one doubted that it was an original invention until Liebrecht (in the *Fahrbuch für Romanische Literatur*, 1862) made the interesting discovery that the groundwork of the romance is derived from Buddhist sources, and that the history of the imaginary Josaphat and his equally imaginary father Abenner is simply a Christianised, but otherwise very accurate, picture of the life and spiritual transformation of Siddhartha (son of Suddhodana, king of Kapilavastu), who subsequently, under the name of Buddha, became the founder of the religious system which bears his name. The author of the Greek original is not known. It has been erroneously attributed to Joannes Damascenus and to Anastasius Bibliothecarius, but is more probably the work of an Ethiopian Christian. Although the Greek text is the original, it was first published by Boissonade in his *Anecdota* (Par. 1832), and has only once been translated—viz., into German by Liebrecht (Münst. 1847). The Latin version, on the other hand, has been the mother of a numerous progeny. Besides being itself frequently printed towards the close of the 15th c., it gave birth to three French metrical translations still unprinted, one by the Anglo-Norman trouvère, Chardry (13th c.), another by Gui de Cambrai, and a third by Herbert, as also to several independent prose versions which were published at Paris in the 16th c. From a Northern French or Provençal version came the Italian *Storia de S. Barlaam*, about the beginning of the 14th c. In Germany, again, the Latin originated three native works in verse, that of Rudolf of Ems

(first printed at Königsberg by Köppke in 1818, and again at Leipzig by Pfeiffer in 1845); one by an unknown author, fragments of which have been printed by Pfeiffer in his *Forschung und Kritik auf dem Gebiet des Deutschen Alterthums* (B. 1. Vien. 1863); and a third, of which a complete MS. exists in the Solms-Laubach library. There is also a German prose translation extant in an undated Augsburg imprint, and supposed to belong to the last decade of the 15th c. From the Latin have also come a Spanish version (Madr. 1608), a Bohemian (composed about 1470, printed at Prague in 1593), and a Polish (Cracow, 1688). The German is the source of the Icelandic *Barlaam's Saga*, and the Swedish *Barlaam och Josaphat*. No version of the romance exists in English.

Bar-le-Duc ('the duke's citadel'), or **Bar-sur-Ornain**, the chief town of the department of Meuse, France, on the Ornain, 125 miles by rail E. of Paris. It was founded in the 10th c., was once capital of the Duchy of Bar (whence its name), contains a communal college and public library, and has manufactures of cotton, calicoes, and comfits. Near it are large smelting furnaces. Pop. (1872) 14,664.

Barlett's, a seaport on the Adriatic, in the province of Bari, S. Italy, trading principally with Greece, the Ionian Islands, and the Adriatic ports. B. is a clean, well-built town, with a cathedral, a college, and a very strong fortress. The harbour is approached by a magnificent gateway. Exports, wine, oil, salt, skins, corn, &c. Pop. (1872) 28,163.

Barley (*Hordcum*), a genus of *Gramineæ* or grasses, of which the two-rowed B. (*H. distichum*) is the species most commonly cultivated; the *H. vulgare* (bigg), or four-rowed B., and *H. hexastichum*, or six-rowed B., being found in higher districts, and but rarely cultivated in Britain. The inflorescence or arrangement of the flowers and their parts in B. is *spicate* or *spiked*. The one-flowered spikelets are arranged in threes on each joint (or *rachis*) of the inflorescence. In two-rowed B. the single floret or flower of the central spikelet is alone fertile, the florets of the two lateral spikelets being barren. In six-rowed B. each of the three spikelets contains a fertile floret. Two outer glumes or scaly bracts exist, and one flowering glume. There is one *pa'* or innermost glume. Two lodicules or minute scales exist, and represent a *perianth*, or outer flower envelope. The stamens number three, and the styles or terminal points of the *carpels* (*pistils*) number two. B. forms one of the cereals most extensively cultivated, from its being used in many forms in the industrial processes of civilised life. It is regarded as the first cereal brought under cultivation. It was grown in Egypt and Palestine of old, and is mentioned in Homer's works. It is remarked frequently in the Old Testament; beer being made from it by the ancient Greeks, Egyptians, and Germans. B. probably originally came from Central Asia. It is cultivated generally as an annual crop, although some varieties bear sowing in autumn, and grow through the succeeding winter. It equally bears cold, temperate, and warm climates, and is the favourite cereal of northern nations. Its general use in Britain is for making Malt (q. v.), used in the manufacture of beer (see BREWING); but B., with the husks or palea simply taken off, is used as food, under the name of pot or Scotch B. With the seed further uncovered, it becomes the finer pearl B. Other species and varieties of B., besides the principal ones already mentioned:—Siberian B. (*H. celeste*) is cultivated in Europe for its larger straws. In this and in the Nepaul or Himalayan B. (*H. trifurcatum*) the seeds are naked—that is, the palea separate readily from the seeds. The *Chevalier*, early English B., and Italian B. are the best-known varieties of the common two-rowed species. The battledore or sprat species, or German rice (*H. searriton*), is two-rowed, and possesses prominent grains, with the awns spreading widely. Other uncultivated species of the B. genus are the *H. murinum*; the *H. jubatum*, or squirrel-tail grass of N. America; the meadow-grass (*H. pratense*); and *H. bulbosum* of S. Europe.

In Europe, B. is chiefly cultivated for export purposes in Denmark and Silesia; and in America, in Mexico, the United States, and Canada. Britain affords soils very favourable to the growth of B.; and Suffolk and Norfolk are the two chief English B. counties. Throughout Scotland generally B. is widely grown. B. crops generally follow root-crops consumed by sheep on the land. Some take B. after wheat, to ensure a moderately rich state of the ground only, as B. does

not produce well in overly rich soils. The condition of his sheepfold is, in fact, the leading thought in the barley-grower's mind. The ground is ploughed as early as possible, to obtain frost, and to a depth of about 3 inches; a fine top with a firm bottom being the best conditions for sowing, and one which prevents weeds springing up, and the soil thus lies open through winter. B. may be sown from the middle of February till the end of May. Early sowing, however, is preferable. The seed runs about 2½ to 3 bushels per acre. Rolling the ground is all that is required after sowing B. If required for malting, B. is allowed to ripen more fully than wheat; great care is required in its harvesting, and it requires also to be 'hummelled,' or deprived of its 'awns' after it has been thrashed—a process accomplished by means of a special apparatus attached to the thrashing-machine. From 46 to 60 bushels of B. may be got from each acre sown on good soils. The chief B. manures are the sheep-droppings, guano, rape-cake, &c. From 2 to 4 cwt. guano per acre, is the proportion employed in Scotland. About 10,000,000 qrs. of B. are grown annually in Britain. In 1873, the number of acres under B. in Britain was 2,574,529; in France (1872), 2,669,489; in the United States (1872), 1,397,082.

Barleycorn, an old measure of length, equal to about the third of an inch.—**John B.**, a jocular personification of the spirit of barley—i.e., malt-liquor.

'Inspiring, bold John Barleycorn,
What dangers thou canst make us scorn!'—BURNS.

Barlow, Joel, an American poet, politician, and pamphleteer, who was born at Reading, in Connecticut, 24th May 1755, and served as a military chaplain in the War of Independence, obtained considerable reputation in 1787 by the publication of a poem called *The Vision of Columbus* (republished in 1805 under the title of *The Columbiad*), which, although very unequal, contains some fine passages. Other of his works are *The Conspiracy of the Kings* (1791), and a comic epos, *Hasty Pudding* (1805). B. filled several political posts. In 1811 he was appointed ambassador of the United States to the Emperor Napoleon, and died December 22, 1812, at Zarnawicz, when on his way to a conference with the Emperor at Wilna.

Barm (a corruption of *beer ream*, beer cream, still 'ream' in Lowland Sc.), the name given in Scotland to YEAST (q. v.).

Barmecides, or **Bar'mekides**, an illustrious Persian family belonging to the province of Khorasan. Barmek, the founder of the family, left a son Khaled, vizier to Abul Abbas Al-Saffah, the first Abbaside calif, and ultimately tutor to the famous Harun Al-Raschid. When Harun succeeded to the califate in 786 A.D., he chose for his vizier Yahya, the son of Khaled, whose administrative abilities, civil and military, gave stability and splendour to the reign. Harun, at length becoming jealous of the popularity of Yahya's son Jarfar, had him beheaded; all the other B. were imprisoned, and their goods confiscated; and the very mention of their name was forbidden on pain of death.

Barmecide's Feast, a phrase become proverbial for a feast on imaginary dainties, and originating in the story of the barber's sixth brother, in the *Arabian Nights*, an abridgment of which, in the 162d number of the *Guardian*, was long a favourite extract for English school-books. The gist of the story is this: Poor Shacabac, distressed by a two days' fast, visited a wealthy but eccentric Barmecide, in the hope of being welcomed to good cheer. Being presented with an empty plate, on which were supplied several courses of imaginary dainties, Shacabac, entering into the humour of his host, praised them highly. When wine, however, was presented, of course equally imaginary, he excused himself from indulging in it on account of his quarrelsome humour over his cups. Being pressed, he soon feigned unwonted exhilaration, and gave his host a box on the ear. The Barmecide, pleased with the spirit and humour of his guest, had the reality of a banquet served up, and Shacabac now feasted himself to his heart's content.

Bar'men, a town of Düsseldorf, Prussia, near Elberfeld, 25 miles N.E. of Cologne, with which it is connected by railway. It extends for about 5 miles in the valley of the Wupper, and in reality consists of five distinct villages, which together form a manufacturing town of the first rank. B. contains 361 factories, producing chiefly cotton, silk, linen, ribbons, thread, and buttons, to the annual value of about £571,500. It is the seat of the Rhine Mission Society. Pop. (1872) 74,449.

Barnabas, St (Heb. 'son of prophecy'), a surname given to Josès (Acts iv. 36), who was a Levite of Cyprus, and along with Paul was recognised as an apostle of the uncircumcision (Acts xv.). In the New Testament there is no further notice of him after he sailed for Cyprus the second time; according to one tradition he suffered martyrdom in Cyprus at that time; according to others, he preached at Rome and Alexandria, became first Bishop of Milan, &c.

Barnabas, Epistle of, a work long ascribed by tradition to B., and according to Jerome read along with the Apocrypha, resembles, in its style and matter, the Epistle to the Hebrews, and was intended to convince the Judaizing Christians of the time that the old covenant was only an imperfect type of the new. By the best critics it is now regarded as spurious, and assigned to the first half of the second century. One of the old arguments against its authenticity, that the first five chapters only existed in Latin, cannot now hold good, since the whole of the original Greek was discovered by Tischendorf in the Codex Sinaiticus.

Barthabites, a monastic order founded at Milan in 1530, and sanctioned by Popes Clement VII. and Paul III., obtained their name from the Church of St Barnabas in that city. They undertook to visit the sick, preach, instruct the young, and take charge of souls. They were speedily regarded with favour in Italy, France, Austria, and Spain. Theology was taught by them in the schools of Milan and Pavia. To the three customary evangelical vows—poverty, chastity, obedience—the B. added a fourth, not to sue for church preferments. They have still some twenty houses or colleges in Italy and Austria, the chief of which is at Rome.

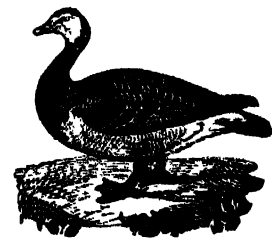
Bar'nacle (*Lepas*). A genus of *Cirripedia* (q. v.) (Crustaceans), forming the type of the family Lepadidæ, and distinguished by the possession of a muscular flexible stalk or *peduncle*, by means of which these forms attach themselves to fixed or floating objects. The *capitulum* or head-like part of the animal, borne on this stalk, consists of a body enclosed within a case formed by a number of calcareous or shelly plates. The peduncle represents the anterior or front portion of the body. The shelly case is composed of five pieces, two pairs forming the sides, whilst the fifth piece closes the back of the structure. From within this shelly covering, the limbs, converted as in the Balanidæ (see *BALANUS*), or 'sea-acorns,' into filamentous organs, are continually being protruded in search of food; whilst a complicated body-structure is also to be discerned. The barnacles undergo a metamorphosis on passing from the young to the adult state; the embryo being at first free-swimming, and finally attaching itself, and developing the fixed form. Most of the barnacles are hermaphrodite. They attach themselves sometimes in immense numbers to floating timber, and the progress of ships through the water is occasionally impeded by the thick coating of barnacles attached to their sides. The common species is the *Lepas anatifera*. Other species are the *L. pectinata*; *L. fascicularis*.

Bar'nacle or **Bernicle** Goose (*Anser bernicla* or *leucopsis*), a species of *Anseridæ* or geese, deriving their popular name from a superstition that they originated from Barnacles (q. v.). Gerarde, in his

'Herball,' dating 1633, gravely states that 'in the north part of Scotland, and in the islands adjacent called Orchades' (Orkneys), there are found 'certaine trees whereon doe growe certain shell-fishes of a white colour tending



Barnacle.



Barnacle Goose.

to russet, wherein are contained little living creatures; which shels in time of maturitie doe open, and out of them grow those little living foules, whom we call barnakles, in the North of England brant geese, and in Lancashire tree geese; but the other that do fall upon the land perish and come to nothing.' The B. G. is of smaller size than the wild goose. It averages 2 feet in length, and 5 lbs. in weight. The forehead, cheeks, and throat are white; the bill is black, as also are the crown of the head, neck, and breast. The rest of the upper plumage is greyish, the lower portions being white. A black strip extends from the base of the bill to the eye. It inhabits the W. coasts of Britain and Ireland in winter; whilst in spring and summer it is found on the coasts of Norway northwards to the Arctic Ocean.

The brent goose (*Anser brenta* or *torquata*) is different from the previous form, and is a distinct species. It averages 21 inches in length, and the plumage is generally darker. The upper parts are black, the sides of the neck being marked with white; the lower parts are white and slaty-grey in colour. It breeds in the arctic regions, but is common in Britain, Europe, and N. America in winter. Hutchins' B. (*A. Hutchinsii*) possesses a triangular patch of white on each side of the neck, and is found in Hudson's Bay and on the northern coasts of America.

Barnacles, an instrument used for breaking horses, and resembling what are now called twitchers, is a frequent heraldic charge.

Barnard Castle, a town in Durham, on an eminence on the Tees, 40 miles from its mouth, with manufactures of hats, carpets, and stockings. A magnificent museum (1869-78), with picture and sculpture galleries, erected at the cost (£100,000) of the Countess of Montalvo. It takes its name from the castle founded there about 1180 by Barnard Baliol, one of the followers of William the Conqueror, and an ancestor of John Baliol, king of Scotland. Pop. (1871) 4276.

Barnaul', a town in the government of Tomsk, W. Siberia, at the juncture of the B. and Obi, with a mining school, museum, and a magnetic and meteorological observatory. It is the seat of the government Altai smelting-works, and in the vicinity are gold and silver mines. Pop. (1867) 12,928.

Barnave, Antoine-Pierre-Joseph-Marie, born October 22, 1761, at Grenoble, lawyer and politician, and member of the States-General in 1789. His ideas were advanced, and it was owing much to him that the Jews were then emancipated and the slaves liberated. In opposition to Mirabeau, he maintained the right of the National Assembly to proclaim peace or war. The violence of the revolutionary party induced him to retire to Grenoble when the National Assembly was dissolved; but being convicted of corresponding with the court, he was guillotined, 29th November 1793.

Barnes, Rev. William, poet and philologist, born at Rush-bay, Bagber, Dorsetshire, in 1810, wrote three collections of poems in the Dorsetshire dialect, entitled respectively *Poems of Rural Life in the Dorset Dialect, with a Dissertation and Glossary* (Lond. 1844); *Humely Rhymes, &c.* (Lond. 1859); and *Poems of Rural Life, &c.* (Lond. 1862). In November 1859 a writer in the *North British Review* bestowed on Mr B. the rather extravagant praise of being the best rustic eclogue-writer since Theocritus; adding that his poetry combined the merits of Wordsworth and Burns, but with no trace of imitation. This eulogium is to a certain extent merited by the freshness and truth of his descriptions of local scenery, by his sincere love of nature, and by his genuine and unaffected sympathy with the persons, passions, and fortunes of the subjects of his rhymes. B., who was for several years master of the grammar school at Dorchester, was ordained in 1847, and in 1862 was appointed rector of Winterbourn-Came, Dorset. He is B.D., St John's College, Cambridge. Among his philological works may be mentioned, *An Investigation of the Latins of Case in Language* (Lond. 1840); *The Elements of English Grammar* (Lond. 1842); *An Anglo-Saxon Delectus* (Lond. 1849); *The Song of Solomon in the Dorset Dialect, from the Authorised English Version* (Lond. 1859)—Prince Louis Lucien Bonaparte defrayed the expense of printing this; *Tiv, or a View of the Roots and Stems of the English as a Teutonic Tongue* (Lond. 1862). His *Outline of English Speechcraft* (1878) is a quaint but unavailing effort to annul the linguistic results of the Norman Conquest.

Barnet, Chipping, an old town of Hertfordshire, 11 miles N.N.W. of London by rail, formerly a place of importance on

the great northern coach-road. Here, April 14, 1471, the Yorkists gained a victory over the Lancastrians, which placed Edward IV. on the throne. An obelisk commemorative of the battle was erected in 1740. B. has large horse and cattle fairs. Pop. (1871) 3720.

Barneveld, Jan Van (of the knightly house of Oldenbarneveldt), born in 1547 at Amersfoort, after studying in the universities of Holland, France, Germany, and Italy (where he became distinguished as a civilian), and serving at Haarlem and Leyden in the Dutch war of independence, attained through successful practice in the Dutch courts the position of Chief Pensionary of Rotterdam in 1576. On the death of William the Silent, B., as ambassador to England and France, offered these governments the Protectorship of the Confederated States; on their refusal, carried through the successive elections of Maurice of Nassau as Stadholder of five provinces, and in 1586, although a native of Utrecht, became Advocate of the leading province, Holland. In this post he had to oppose the imperious Leicester, who held a place in the Council of State, and to adjust the claims of State and Church to the ownership of ecclesiastical property and the control of education by the establishment of a mixed lay and clerical board. In 1598 the Treaty of Vervins called B. to France, where he obtained from Henry a large promise of pecuniary help: in the same year he arranged with Elizabeth the public debt and securities which England then held from the Republic. In 1603, during the famous siege of Ostend, B. again appeared at the English court and secured an alliance with James, to which Sully, as representing France, was a party. The next diplomatic feat of B. was the treaty of peace for twelve years between Spain and the Republic, dated 9th April 1609, which, although the foundation of Dutch political independence and equality, not only exposed him to the suspicion of the clerical bigots, but estranged from him Maurice the Stadholder. The struggle of Arminians and Gomarists was already raging, and B. had defended the cause of toleration. The appointment of Vorstius to a chair at Leyden and the royal marriages of France and Spain gave B. very great trouble. Prince Maurice, taking the side of the democratic Contra-Remonstrant party, opposed the party of aristocratic Federalists and Arminians, with whom B. was connected. The latter seems to have been the first among Protestant statesmen to foresee the designs of the Catholic League, and the magnitude of the impending Thirty Years' War, which was precipitated by the apathy of James I. At this time Carlton was the British ambassador at the Hague, and Caron the Dutch ambassador at London. In 1616 (the year of Coke's dismissal) B. prevailed on James to compound the large debt due by the States, and to free the cautionary towns, Flushing, Brieke, and Rammekens. He also assisted Savoy against Spain. The rebellion in France against the Concis further estranged B. and Maurice. The opposition of the former to the new W. India Company procured him enemies among the Amsterdam merchants, and strengthened the unjust suspicion of his connection with Spain. Then came the question of the National Synod, or of the right of the States-General to enforce Calvinism on the seven republics by means of an ecclesiastical synod; the enlisting of Waastgelders in the state of Utrecht; the occupation of Overijssel and Guelderland by the Prince. In 1618, after struggling to the last to avert civil war and to uphold the union of 1579, B. was illegally arrested, along with Grotius (then Pensionary of Rotterdam) and Hoogerbeets, by a secret order which was afterwards adopted by the States-General, in spite of the protest of the States of Holland. On 7th March 1619 (during the sittings of the Synod of Dortrecht) he was brought to an illegal and oppressive trial by twenty-four commissioners from the States; found guilty, asserting the right of provinces to settle each its own religion; and in spite of the intercession of the French ambassador, Maurier, he was executed in the Binnenhof at the Hague 13th May 1619. See Deventer's *Gedenksrukken van Olden Barneveldt en zijn Tijd.* (3 vols. Haag, 1862-65), and Motley's *Life of B.* (2 vols. Lond. 1874). For what may be called the Orange Calvinistic view of the question, see M. Groen van Prinsterer's *Maurice et Barneveldt, Etude historique* (Utrecht, Kerckhoffs, 1875). B. was a man of great energy and courage, and a fine character.

Barnsley, a flourishing town in the W. Riding of Yorkshire, 16 miles N. of Sheffield, on the right bank of the Don, as B. does

in a rich coal and iron mining centre. It formerly produced the finest ironware in England, and is now noted for its linen cloth, damasks, drills, and diapers. There are also extensive iron-foundries, glassworks, and bleaching-grounds. Four railways pass through B., which is also connected with the Don and Calder by two canals. New public baths were opened in 1874, and the Locke public park in 1877. Pop. (1871) 23,021.

Barn'stapse (lit. 'a barn for merchandise'), a seaport of Devonshire, beautifully situated on the Taw, 6 miles from the fine Bay of B., in the Bristol Channel, and 34 miles N.W. of Exeter. It was an important place of trade in early English times, and in 1588 three vessels were equipped here to oppose the Armada. Its shipping has suffered from the silting up of the harbour; but it still carries on an active trade, and has manufactures of pottery and lace. A new fishmarket was opened in 1871. B. returns two members to Parliament. Pop. (1871) 11,813.

Bar'num, Phineas Taylor, the great American showman and 'prince of humbugs'—a title which he accepts with no small gratification—was born at Bethel, Connecticut, U.S., July 5, 1810. He tried journalism and the stage at an early period, but entered on his true career when, in 1835, he bought Joice Heth, an old negro woman, who was represented to have been the nurse of General Washington, and to be 160 years of age. Upon this venerable negress, the nurse of the patriot, B. based his fortune. Thousands of visitors from every city in America flocked to see the early guardian of the great Liberator. B. subsequently 'took up' Tom Thumb, established his famous museum in New York, and became 'the apostle of total abstinence'; but his most profitable speculation as an *entrepreneur* was his engagement of Jenny Lind for a series of concerts in the United States, Canada, and Cuba, by which he made 350,000 dollars. This engagement terminated in June 1851, after which date B. was elected president of a bank, commenced farming, and speculated in real estate. But he was out of his element in dealing with anything but shams, and the result was that he lost his fortune and became bankrupt. In 1855 he published his *Autobiography*, and in 1857-58 he lectured in London, again filling his pockets by explaining the *ruses* he had formerly practised for emptying the pockets of others. After a vain attempt to succeed in politics, he recommenced showman in 1871 with a circus and menagerie.

Baroach', or Broach (supposed to be the *Barygaya* of Arrian), the chief town of an executive division of the same name, in the N. of Bombay presidency, India, and situated on the Nerbudda, about 25 miles from its mouth. It belonged formerly to the kingdom of Gujerat, but, after a few changes, was taken by the British in 1772, ceded to Scindiah in 1783, and retaken by British troops in 1803. Estimated pop. (including the suburbs) about 30,000. It carries on a considerable and growing trade in cotton, grain, and seeds with Bombay and Surat. Area of division, 1318 sq. miles; pop. (1872) 298,889.

Baroche', Pierre Jules, born at Paris, 8th November 1802, joined the bar in 1827, distinguished himself in the case of Colombar, and in 1847 was elected deputy for Charente and Bâtonnier of the bar. The post of Bâtonnier resembles that of Dean of Faculty in Scotland. He acted with Barrot against Guizot. A member of the Legislative Assembly of 1849, B. became Procureur-Général, and occupied the posts of Minister of the Interior and of Foreign Affairs under the Republic. After the *coup d'état*, he became Vice-President, and then President of the Council of State, which, after the death of Billault, he represented in the Chamber. Although once a republican, he embraced the Emperor's policy of despotic centralisation supported by espionage. He was appointed Minister of Foreign Affairs in 1860, Minister of Justice and Public Worship in 1863, and in 1867 received the Grand Cross of the Legion of Honour. He died in the island of Jersey, November 2, 1870.

Baro'da, the most important of the Gujerat native states, Bombay, India, has an area of 4399 sq. miles, and a pop. (1872) of 2,000,225. It is intersected by the western spur of the Vindhya mountains, but is well watered, and fertile. Rice, wheat, millets, cotton, sugar cane, tobacco, and opium, are the chief products. Several of the late Gaekwars of B. have been notorious for their criminal misrule. In 1873 a commission was appointed to examine into the condition of the country, and a result of its report was, that the Gaekwar was allowed a probationary period of eighteen months to reform his administration. After being

tried on a charge of attempting to poison Colonel Phayre, the British resident at his court, he was deposed by the British Government. Gopal Rao, the eldest son of the previous Gaekwar, was appointed in his stead, June 1875. B., the capital, is situated on the Vishwamitri river, near the Gulf of Cambay, 235 miles N. of Bombay by rail. Pop. (1872) 112,057. B. is crowded with palaces and temples; its streets swarm with mendicant Brahmins and irregular soldiers. There are also menageries of wild animals, and athletes are trained for the arena. Much wealth is displayed by the sirdars, the bankers, and the jewellers.

Bar of Dower, a widow's right to Dower (q. v.) may be barred or defeated by certain delinquencies on her own part, or substitution of jointure. In Scotch law the corresponding term to dower is Terce (q. v.). It may be similarly barred or excluded.

Baro'meter (Gr. *baros*, weight; *metron*, a measure) is an instrument for measuring the weight or pressure of the atmosphere. That the air has weight was first proved by Otto de Guericke in 1650, who showed that a vessel, when exhausted of its contained air, weighed less than when full; and weight implies, of course, a downward pressure, which lessens as the height increases. Torricelli in 1643 made an experiment which proved conclusively the presence of such a pressure, and at the same time gave a convenient method of measuring its intensity with considerable accuracy. Take a tube, about one yard in length, and one-third inch in diameter, fill it entirely with mercury, and after having closed the open extremity with your finger, invert it into a trough containing this metal. Upon withdrawing the finger, the mercury in the tube will be observed to fall, till it reach a height which, in ordinary circumstances, is about 30 inches above the surface of the liquid in the trough. The conclusion, therefore, is, that any given surface experiences, on account of the air, a normal pressure which is equal to the weight of a column of mercury with this surface as base, and with a height of 30 inches. If an analogous experiment be made with water, which is 13.59 times less dense than mercury, a column about 32 feet high will be required to balance the pressure of the atmosphere; and in this lies the explanation, that a pump cannot raise water from a depth greater than 32 feet. It must be noticed that the Torricellian vacuum, that portion of the tube above the column of mercury, is not a true vacuum, but is filled with a certain quantity of vapour of mercury.

When a graduated scale is placed alongside the tube, the variation of the pressure of the atmosphere may be shown by the corresponding effect produced upon the height of the mercuric column. We must, however, correct for the change of level which the surface exposed to the atmospheric pressure also necessarily undergoes, for change of temperature, and for capillarity. Besides the cistern B., which is simply a straight tube with its open end immersed in a trough of mercury, as in the Torricellian experiment, we have the syphon B., in which the tube is bent round at the lower end like the letter U, and the cistern is merely an expansion of the tube.

It is to the latter form that the majority of those in common use belong. Of such may be mentioned the wheel B., in which a hand is moved before a dial, by means of a toothed wheel and rack, which is fastened to a plug resting upon the exposed surface of the mercury; Fortin's B. (improved by Negretti and Zambra), surrounded by a brass tube and enclosed in a cylindrical wooden case, the lower portion of which is made up of three distinct pieces, which, working on hinges, are capable of an outward and upward rotation, thereby forming a tripod stand, and enabling observations to be made much more conveniently; and Gay-Lussac's B. (see fig.), peculiar in having the lower portion of the tube bent, so that the shorter leg is in the same straight line with the upper portion of the longer one, thus presenting greater facilities for measuring the true height of the mercuric column.

The B. is applied to many and important uses, of which we may enumerate the following:—Its indications form an essential element in the determination of atmospheric refraction. It is extensively employed in the measurement of altitudes, and in the



Baro-meter.

chemical analysis of gases, and is one of the most characteristic instruments employed in navigation and meteorology. No certain rules can as yet be laid down for the prognostication of the weather by its means; but considering the great value which it reached in the hands of Admiral Fitzroy, there is a strong probability that ere long, supplemented by other meteorological observations, the B. will afford pretty certain means of predicting an approaching atmospheric change. As a general rule, a falling B. indicates wet, and a rising, fair weather. A rapid fall portends a short but violent storm,—a slow and steady fall, a continued rain with a moderate wind. A sudden fall in hot weather indicates thunder, with a succeeding cool air. Unsteady fluctuations are usually attended by broken weather; and serene weather can be expected only with a steady or slowly rising mercury. A wind veering round in the direction from W. to E. by S. is usually attended with a fall; when it moves round in the opposite direction (with the sun), a rise is commonly observed. During an E. wind, the B. is generally high (30 inches or upwards); and a steady and considerable fall during its prevalence generally indicates a change of wind to the south, with subsequent heavy rains. It is to be noted, in conclusion, that the greater fluctuations in the mercuric column are produced when there are several differently directed strata of air, a high pressure being usually prevalent when the upper current is N., and a low pressure when it is from the S. and S.W.

Barometz, or **Tarta'rian** or **Soyth'ian Lamb**, a term applied to the rhizome or prostrate stem of the *Cibotium barometz*, a species of fern found near the Caspian Sea. It derives its name from the shaggy appearance which the silky scales on the rhizome give to it, causing it to resemble a lamb lying down in the pasture. In early times ridiculous stories of this plant being half lamb, half fern, and sharing the habits and qualities of both, prevailed. It is also called *baránez* (diminutive of *barán*, a sheep) by the people of the country. Erman (*Travels in Siberia*, vol. I. p. 112) considers that mixed up with the fables concerning it were some vague ideas in regard to the use to which cotton was applied.

Baron. This term is used historically to denote any member of the peerage of England or of Scotland. Thus, when we read of 'the barons,' we understand the term as equivalent to that of 'the peers' in our own time. B. is now the title of the lowest order of the peerage of England, Scotland, and Ireland, and of the United Kingdom. In the reign of Henry III. in England, the burgesses of London were styled barons, and so were persons holding lands of the king. The order was then divided into *greater* and *lesser* barons, a distinction which seems to have prevailed in most of the countries of Western Europe. The greater barons were the king's chief tenants, holding their lands directly from the crown; the lesser barons again held from the greater by the tenure of military service. A B. may now hold his title—(1) by prescription, 'for that he and his ancestors have immemorially sat in the House of Lords'; (2) by patent, bearing to be to the heirs of him who is created; (3) by tenure, holding the title as annexed to a grant of lands. This is the title by which the bishops sit in the Upper House, though Mr Hallam considers that they hold their legislative places in virtue of their ecclesiastical office, this being according to the custom of Europe. According to Blackstone, 'creation by writ is the more ancient way; but a man is not ennobled thereby, unless he actually takes his seat in the House of Lords; and some are of opinion that there must be at least two writs of summons and a sitting in two distinct parliaments to evidence an hereditary barony.' Creation by writ is, however, now almost obsolete. It has been held by the House of Lords, in the Wensleydale case, that when creation is by patent, the patent must be in favour of heirs, otherwise that the grantee is not entitled to sit in the House of Lords.

In the House of Peers there are at present (1875) 242 barons. In the peerage of Ireland there are 70. In that of Scotland, by the Union Roll, there were 49; five have subsequently been enrolled, many have since become extinct, attainted, dormant, or have merged in higher titles.

In writing to a B. the proper address is 'The Right Honourable Lord —'. The children of a B. are addressed as 'The Honourable —', with Christian name and surname. The eldest son of a B. in Scotland has the courtesy title of 'Master of —' (whatever be the title of his father).

Baron and Feme, or **Femme**, are two words used in English lawbooks to denote husband and wife. They are Norman-French. In heraldry, B. and F. denotes the bearing of the arms of husband and wife on the same shield.

Baron of Beef, a double sirloin (q. v.), weighing from 50 to 100 lbs. These two sides of the back of an ox, when served at certain great English festivals, are prominently placed, and ceremoniously carved. Baron is probably a fanciful allusion to the lesser rank of 'sir' in the single loin of beef.

Baronet. This is the lowest hereditary title in the United Kingdom. A B. is a commoner, ranking immediately after the younger son of a baron. The wife of a B.—who is entitled to be addressed as 'Lady'—ranks immediately after the wife of the younger son of a baron. See PRECEDENCE. The order was instituted by King James I. of England in order to raise money, the fees of patent being upwards of £1000. When we consider the value of money in those days relatively to its value now, and the difference between the real wealth of England then and now, it is curious evidence of the general love of imaginary distinction that some 200 people availed themselves of the royal offer. In Scotland, the order of baronetcy, though projected by James, was not instituted till the succession of Charles I. in 1625. The Scotch order is 'B. of Scotland and Nova Scotia.' The creation ceased at the union with England in 1707. Irish baronets were also created till the union with Great Britain in 1800, when the Irish creation ceased. Subsequent to 1707 all creations of baronetcy are either 'of Great Britain' or 'of Ireland.' Subsequent to 1800, they are all 'of the United Kingdom.' The creation of a B. may either be by writ or patent. The order of the descent of the dignity is variable. It cannot be held by a woman, but it may pass to the husband of an heir-female.

Baronius, **Cæsar**, a Roman Catholic historian, born 30th August 1538, at Sora, and educated at Naples, entered the discipline of the Congregation of the Oratory at Rome, where he succeeded St Philip Neri as superior (1593). Clement VIII. made him successively papal confessor, cardinal, and librarian of the Vatican. B. belonged to the French party at Rome, which elected Leo XI. and Paul V. (1605); he might have secured the chair, if his book *De Monarchia Sicilia* (suppressed by the Regent Ponté at Naples) had not specially incensed the Spanish party. From 1588 to 1607 B. wrote his great work *Annales Ecclesiastici* (continued by Rinaldi to 1571), to exhibit the unity of the Church during the first twelve centuries. It was intended as the Catholic reply to the *Centuriators* of Magdeburg; and was criticised in a hostile spirit by Isaac Casaubon and Samuel Basnage. In spite of its faults, it is a work of vast and rare erudition, and a knowledge of its contents is indispensable to the student of ecclesiastical history. B. belongs to the period of Tasso, Caracci, Palestrina, and Bellarmine. He died 30th June 1607. Of the *Annales*, the best edition (with Pagi's critical examination and Raynaldi's continuation) is that of Mansi Lucca (43 vols. 1738–59). At present, Aug. Theiner, a priest of the Oratory, and coadjutor-prefect of the secret archives of the Vatican, is issuing a new edition and a continuation of B.'s great work, of which 18 vols. had appeared between 1863 and 1873. A life of B. by Lefèvre was published at Douay in 1668, and another by M. La Croze.

Barons of Exchequer. The judges of the Court of Exchequer in England are called B. of E. They are the Lord Chief Baron and four *puisne* Barons. See COMMON LAW, COURTS OF; COURT OF JUDICATURE, SUPREME ACT.

Barony means in law the manorial and hereditary right belonging to the possession of land. In former times it involved a criminal as well as a civil jurisdiction; but by modern legislation, little now remains of either. The *Court Baron* was a court composed of the tenants of the lord of the manor. It had jurisdiction in petty personal cases.

Barossa. See BUCKU.

Barque. See BARK.

Barquesime'to, the capital of a province of the same name, Venezuela, on the Cojeda, a branch of the Apuré, 163 miles W.S.W. of Caracas, and 75 S.W. of Valencia. It was founded in 1522 by Juan de Villegas for the sake of the gold-mines supposed to exist in its vicinity, and was named by him New Segovia. B. was long a flourishing place of trade, but was

destroyed by the terrible earthquake of 1812. It has now, however, more than recovered its former importance, and has a pop. (1873) of 25,664. The maritime province of B. has an area of 9305 sq. miles, and a pop. of some 113,000.

Barr, a town of Alsace-Lorraine, Germany, 18 miles S.W. of Strasburg, at the foot of the Vosges, and at the entrance of the picturesque valley of Ulricht. It carries on a trade in wine, brandy, timber, cattle, and iron, and has some woollen and cotton manufactures. B. is much resorted to on account of the beauty of its neighbourhood. Over the town rises the Odilienberg to a height of 2450 feet, with its once famous cloister, built, it is said, by a Saint Odilia, daughter of a Duke of Alsace, in the latter part of the 7th c. Pop. (1873) 5655, with the suburb La Vallée.

Barr, or **Barra**, a small Mandingo kingdom at the mouth of the Gambia, W. Africa, well cultivated, fertile, but somewhat marshy. Area estimated at 250 sq. leagues; pop., according to Goldberry, 200,000, who are superior in physique and intelligence to the neighbouring peoples, and strict Mohammedans in religion. They trade with the interior in salt, and receive in turn maize, ivory, gold-dust, and cotton.

Barr'a, a picturesque town some 3 miles E. of Naples, consisting chiefly of beautiful villas. Pop. 12,000.

Barra do Rio Negro, capital of the province of Amazonas, Brazil, on the river Amazon, not far from the mouth of the Rio Negro, is a flourishing place of trade, with a pop. of 6000.

Barra Islands, the most southerly group of the Outer Hebrides, consisting of some seventeen islands, forming a parish of Inverness, and lying about 40 miles W. of Ardnamurchan Point. By far the largest of the islands gives its name to the cluster, is 8 miles long and from 3 to 4 broad, and has considerable fisheries and a good harbour. Some black cattle and sheep are pastured on the hills, but the soil is wretched. Area, 348 sq. miles; pop. (1871) 1753. On Bernera, the southernmost of the islands, stands the lighthouse of Barrahead, at the great elevation of 680 feet, and visible from a distance of 33 miles.

Barra Man'sa, a town of 6000 inhabitants, on the Parahiba, 70 miles N.W. from Rio Janeiro, in the province of the same name, Brazil.

Barracks (Span. *barracas*, tents, huts), brick or stone buildings for soldiers stationed in towns or permanent camps. The term used to be confined to temporary constructions for cavalry—those for infantry being called *huts*, but it is now used in the general sense given. During the earlier years of the 18th c. strong opposition was made in Great Britain to the introduction of this arrangement for the convenience of the army. On the one hand, it was argued that B. would favour the inauguration of a military caste, so separated from their fellow-countrymen as to be too much under the control of government; and, on the other, that the danger to which the morals of civilians were exposed by the older system of billeting soldiers at private houses was more to be feared than the centralising advantage given to the ruling power by the barrack system. The year 1792 was an era in this movement. It was then that Parliament consented to the founding of several new buildings of the kind, and to the creation of the office of B.-master-general. Another era originated from the disasters which befell British soldiers in the Crimea, owing to defective arrangements for their household accommodation. Returns were ordered by Parliament in 1857 of all the B. in the United Kingdom, and 252 were enumerated, with details of their condition. It was reported that of these only 20 had separate sleeping-places for married people; that sanitary arrangements were very defective in all of them; and that there were no adequate means for the employment or amusement of soldiers. These reports brought about great improvements. According to the Army Regulations published in 1873, the commanding officer, in conjunction with officers of the engineering and control departments, has, on the arrival of troops in B., to ascertain the state of the buildings, to see that it is satisfactory, and then to hand them over to the new occupants, who are to be held responsible for them. Particular attention to the airing of bedrooms is required; and a medical officer is ordered to inspect every apartment once a week. The troops in occupation must sweep and roll the yards and parades. Special attention is given in these regulations to the moral condition of B. 'Commanding officers are to prohibit the indis-

criminate admission of strangers; and are to take means to prevent any but persons of respectable character from gaining access.' The ventilation of stables is carefully attended to; commanding officers being required to see that this arrangement is not counteracted by the men in charge of horses. The use of fireworks within the enclosures of B. is strictly prohibited; and to encourage soldiers in industrial pursuits, allotments of ground for gardens have been made by the War Department. If a soldier marries, he must procure the consent of his commanding officer before he has a chance of being allowed to take his wife to live with him in B.; married women in the proportion of 6 in a company of 100 soldiers being allowed so to live. An extra 2d. a day is allowed to the married soldier who sleeps outside. Aldershot Camp (q. v.) possesses the finest B. in England, if not in Europe; the Curragh Camp is famous in Ireland; and the combined cavalry and infantry B. which is (1875) being built at Maryhill, Glasgow, will be an honour to Scotland. The expenses for works, buildings, and repairs connected with the British army at home and abroad for the year 1873-74 amounted to £778,000. To superintend these constructions and repairs is the duty of the Barracks-master-general; but there are local barrack-masters, mostly retired military officers, who act under his orders.

Barrackpore, a town in the District of the Twenty-four Pergunnahs, Bengal, British India, on the E. bank of the Hoogly, 15 miles above Calcutta. Troops were first stationed here in 1772, whence the town derives its name. It still contains the garrison of Calcutta. S. of these lies the Park, containing the country residence of the Viceroy and the tomb of Lady Canning. It has also gardens, an aviary, and a menagerie. B. is notable for two mutinous outbreaks: one in 1824 of a native regiment that refused to sail for Burmah, and the second in 1857, the first overt act of the Sepoy war. Pop. (1872) 9591.

Barra'da, or **Bura'da**, a river of Syria, which N.W. of Damascus divides into two branches, one of them irrigating the gardens of the city, while the other passes on its N. side. They are conjectured to be the scriptural *Pharpar* and *Abana*. After uniting, they flow in an easterly direction, and fall into Lake Bahr-el-Merj.

Barrafranca, a town in the Italian province of Caltanissetta, Sicily, on a branch of the Salso, 35 miles N.E. of Girgenti, near which are sulphur mines. Pop. 6000.

Barramun'da, the native name of the *Ceralodus Fosteri*, a curious fish which occurs in the rivers of Queensland in Australia, and which appears to be most nearly related to the singular mud-fishes or *Lepidosirens* of American and African rivers. It varies from 3 to 6 feet in length, and possesses a covering of cycloid scales. The skeleton is cartilaginous. The operculum or gill-cover is well developed. The tail is homocercal. The heart consists of a single auricle and ventricle, with a contractile *arterial bulb*. The intestine has a spiral valve. No pyloric cæca are developed. The swimming-bladder communicates with the mouth by a pneumatic duct and glottis, and is of cellular or lung-like structure internally. The B. is the 'native salmon' of the Queensland rivers. It appears to be a slowly-moving fish, and feeds on the decaying vegetation of rivers.

Barras, **Paul-Jean-François-Nicolas, Comte de**, a leading figure in the first French Revolution, was born 30th June 1755 at Eohempoux, in the department of the Var, his family being reputed to be 'as old as the rocks of Provence.' After a creditable career as a soldier in India, he returned to Paris, and succeeded in spending his patrimony on its pleasures. He then became a champion of the Revolution, and aided both in dethroning the king (1792) and overthrowing the Girondins (1793). At the same time he was not a Jacobin, but, on the contrary, aided materially in hastening the fall of Robespierre (1794). After that event, he became (November 1795) one of the five members of the Directory which governed France, and for two years he was virtually Dictator. Having entered, as is alleged, into negotiations with the Bourbons, he was, after the 18th Brumaire, displaced by Bonaparte, whose promotion in his early years he had materially aided, and retired to Brussels, thence to Marseille, from which he was banished to Rome, and afterwards kept in surveillance at Montpellier. B. returned to France after the restoration, and lived on his estate of Chaillot, in the neighbourhood of Paris. He died 29th January 1829. Napoleon, in his *Mémoires de Sainte Hélène*, criticises his former

colleague with merciless severity. B.'s *Mémoires* were seized by government, and are still unpublished.

Bar'atry, or **Barretty Common**, in the law of England, is the offence of exciting disputes and lawsuits among the people. It is punishable with fine and imprisonment; and any one after conviction practising as solicitor or agent is liable to transportation for seven years. Related to this offence, and of equal gravity, is that of suing another in the name of a fictitious plaintiff, or of a plaintiff who has not consented to the suit. This offence, if committed in any of the superior courts, is one of 'contempt,' and so punishable at the discretion of the judges. In the inferior courts, the punishment is six months' imprisonment, with treble damages. Officious intermeddling with a suit is also punishable. See **CHAMPERTY**, **MAINTENANCE**. In Scotch law, B. is the crime committed by a judge who accepts a bribe.

Bar'atry of mariners is a fraud by the master or mariners of a ship against the owner or underwriter, punishable criminally by the law of all European states.

Bar'el (Fr. *baril*; It. *barile*; Span. *barrila*), a measure of capacity in different countries of Europe and America, varying greatly, however, according to the locality and the nature of the liquid. Thus, the French standard B., the *barrigue* or cask of Bordeaux, contains 50 English gallons, while the Italian varies from 7 to 31 English gallons. In the old English measures, a B. contained 31½ gallons of wine, 32 of ale, and 36 of beer. Formerly, and to this day, in America, the B. expressed a certain weight of an article: thus a B. of flour contained 196 lbs.; of beef, 200 lbs.; of soap, 256 lbs.

Bar'el, in military art, the essential part of portable firearms. Inferior barrels are forged from soft, tenacious iron: those of fowling-pieces and the better class of small-arms from steeled iron, known as *stub*, *stub-twist*, *Damascus-twist*, *wire-twist*, &c. Stub-iron is formed from old horse-shoe nails, called stubs, with the addition of a small and varying proportion of steel-clippings of the same size as the stubs. Damascus-twist, admired for its ribbon-like markings, is produced by sagotting alternate layers of steel and iron, welding and drawing them into a rod, which is cut into lengths, and each length shortened to one-half by twisting it. In the manufacture of the Martini-Henry rifle, milled steel-scrap, as cuttings of saws, waste from steel-pen and tool making, old coach-springs, &c., are collected and cut into pieces of equal size, placed in a revolving drum, and polished bright by the friction of the parts, and then melted on the hearth of an air-furnace. The bloom thus formed is welded under a three-ton hammer into a large square block: this is reheated and drawn out into bars under a tilt hammer, and the bars are reduced to rods of the required size by being passed through rollers. The cylindrical shape is given to the rods by beating them while hot round a steel core, and finally hammering in a groove of the anvil. The boring is accomplished by pressing the barrel forward upon a rapidly-revolving *bit*, the heat generated by the friction being neutralised by water constantly trickling over the barrel. The exterior of the barrel is smoothed upon grinding-stones, and polished by two clamps faced with leather. See **PROOF** and **RIFLING**. Good fowling-pieces are twisted into form from stub or Damascus iron, which is forged into fillets or ribbons half an inch in width, and of varying thickness, being thinner in the middle than at the ends. The white-hot fillets are then wound in a close spiral round a rod; the spiral is next raised to a welding heat, held vertically with the muzzle downwards, and struck forcibly upon the anvil to cause the seams to unite, and the welding is finally completed by hammering all over. Wire-twist barrels are made of narrower slips than the preceding.

Barrel-Organ, a small portable organ used by street-players. Its sound is produced by a revolving cylinder set round with pins, which, as it moves, open valves admitting wind to the pipes.

Barreto de Resende, Pedro, a Portuguese historian, born towards the close of the 16th c., died at Lisbon in 1651. He has left a splendid work on India, which has never been published, and of which the *Bibliothèque Republique* of Paris contains what is probably the original MS. The work gives coloured plans of all the Portuguese fortresses in India and Africa, with portraits of all the governors and viceroys, from Vasco de Gama to Linhares.

Barrhead' (the first syllable is Celtic, the second English, and both have the same meaning), a town in the E. of Renfrewshire, with cotton-mills, printworks, and bleaching-fields. It is a station on the new Union Railway between Glasgow and Kilmanock. Pop. (1871) 6209.

Barr'icades (from the Ital. *barricida*, introduced into French in the 16th c.), a military term denoting a hastily constructed work in some narrow place, as in a street, a hollow way, or on a bridge, for the purpose of defence, or of obstructing the progress of an enemy. Waggon, beams, chains, *chavaux-de-frise*, paving-stones, and, as the name imports, barrels or casks—in short, whatever comes to hand—are all made use of in their construction. They are principally effective against cavalry attacks, and as a protection against these, even ammunition and baggage waggons are hastily upset. They have been the favourite defences of insurgents in street-riots since the middle ages. Especially in Paris, which may be called the cradle of barricade-struggles, have they been resorted to. In 1358 the streets of the French capital were barricaded against the Dauphin, afterwards Charles V.; in 1436 another bloody struggle was made in the same fashion against the foreign rule of the English; and again on May 12, 1588, against 4000 Swiss soldiers introduced into Paris by Henry III. to intimidate the Council of Sixteen. During the troubles of the Fronde, on the 26th of August 1648 and the following days, 100,000 armed Parisians, it is said, ranged themselves behind 2000 B. The three days' revolution of July 1830 witnessed the erection of thousands of B.; and in 1848, in the insurrection against Louis Philippe there were also struggles at the B. On the night of 23d June 1848 occurred the most sanguinary of all barricade struggles, when General Cavaignac, in defence of the Provisional Government, stormed the B., and 16,000 of the Parisian 'Irreconcilables' were either killed or wounded. B. also played a bloody part in the revolutionary risings of 1848 and 1849 in Milan and Naples, Vienna and Berlin. By widening and asphaltting the streets of Paris, Napoleon III. did much to render such occurrences so difficult as to be almost impossible. In recent times B. have been successfully carried by breaking through the houses of neighbouring streets, and attacking the insurgents in the rear; while street-struggle may be effectually checked by planting cannon on churches and other public buildings, and playing on the combatants from all sides.

Bar'rier Act is the name of an Act of the General Assembly of the Church of Scotland, passed (8th January 1697) with the view of preventing hasty legislation. It provides that no fundamental law of the Church can be changed until the alteration has been submitted, by the General Assembly approving of it, to the consideration of all the presbyteries. The proposed change must then be approved of by a majority of the presbyteries; after which it falls to be considered by the next General Assembly, which may approve or reject. If it approves, the proposed measure becomes law. Similar regulations have been adopted by the Free Church and the other Presbyterian Churches of Scotland.

Bar'rier Reef, the name applied by Mr Darwin to those coral reefs which stand out at a greater or less distance to sea from the land, and thus enclose a strip of water between the reef and the mainland, known as the *inner channel* or *passage*. Such a reef—exemplifying the second stage in the formation of coral islands, and which is produced by the sinking of the original land—is seen on the N.E. coast of Australia, and extends along that coast for 1300 miles; and is distant from 10 to 100 miles from the mainland. On the W. coast of New Caledonia a B. R. runs for 400 miles. The depth in the outer surface of barrier reefs is always considerable. See also **CORAL-REEFS**, &c.

Barr'ing Out, a school custom, described as old in the year 1558, and of which genuine instances occur at the beginning of the present century. It is found in all three kingdoms, sometimes connected with Christmas and Fasten's Even (Lent), sometimes also with Easter and Whitsunday. The pupils took possession of the school-building, and if they could hold it against the 'flogging parson' for three days, the latter, along with two bondsmen, was bound to subscribe certain written 'orders' or rules as to holidays, work, &c., which were then binding for the ensuing session. On the other hand, if an entry was forced before three days' siege, the master acquired a right of unlimited flogging. As the custom has been recognised in

school statutes, dated in 1558 (*Carlisle's Endowed Gram. Schools*, i.), and was enforced at the Edinburgh High School in 1595, to the extent of killing a patron magistrate who was forcing an entry, it would seem that the custom was not an amusement, but a social institution, like flogging, probably not without its uses, when schools were 'places of weeping and flagellation.' See Brand's *Pop. Antig.* by Ellis (3 vols. Lond. 1849).

Barringtonia, *ceae*, a small order of plants allied to *Myrsineae*, and by some authors considered a subdivision of it. They are tropical plants, having large leaves and clusters of fine flowers, with beautiful and numerous stamens. The fruit is fleshy, and the contained kernels have medicinal properties.

Barrister is the name given to the pleaders at the English and Irish bar. In Scotland the corresponding body are called Advocates (q. v.). The general rules of qualification to entitle a man to be called to the bar in all the Inns of Court (q. v.) are—that he must be at least twenty-one years of age, have passed an examination in Roman and civil law, the law of real and personal property, and common law and equity, and have been for five years at least a member of the society. If he be a Master or Bachelor of Arts of either English university or of Dublin University, it is sufficient if he has kept twelve terms, and has been three years a member of the Inn by which he desires to be called to the bar. Serjeants-at-law (*Serviens ad legem*) are barristers so created by the crown. Formerly the common-law judges were exclusively taken from the serjeants; but this custom has been abolished by the Judicature Act of 1873. *Pre-audience*, or right to be first heard by the court, is held so important by members of the bar, that we here give the order of precedence, as settled by royal mandate—1. Queen's Advocate; 2. Queen's Attorney-General; 3. Lord Advocate of Scotland; 4. Queen's Solicitor-General; 5. Queen's Premier Serjeant; 6. Queen's Ancient Serjeant; 7. Queen's Serjeants; 8. Queen's Counsel, and counsel having patent of precedence prior to 24th April 1834; 9. Serjeants-at-law; 10. Recorder of London; 11. Common Serjeant of London; 12. Advocates of the civil law; 13. Barristers generally, according to date of call to the bar.

A B. can maintain no action for his fees, these being held to be given gratuitously. See *FEEs*, PROFESSIONAL. In forensic pleading a B. may state anything communicated to him in his professional capacity, if pertinent to the matter at issue, without examining whether it be true or false. But the observation must be strictly relevant to the point at issue; and a client's presumed ignorance of what is or is not relevant may excuse him in an error before the court which would not be excused to the B., owing to his presumed superior legal knowledge.

The bar of Ireland is subject to nearly the same rules, and is on much the same footing, as the English bar. Before Parliament, the House of Lords, and the Privy Council, barristers and advocates rank alike, and have the same rights and privileges. Before the House of Lords, all cases, from whatever tribunal the appeal may come, may be advocated by members of the English, Scotch, or Irish bar. The rank of Queen's Counsel has recently (1868) been introduced into the Scotch bar.

Barrister, Revising. See *REVISING BARRISTER*.

Barros, João de, a Portuguese historian, formerly spoken of as the *Portuguese Livy*, born at Viseu, in 1496, was appointed page to King Emanuel while still a child, and afterwards became the companion of Dom João, heir to the throne. His romance of chivalry, *Cronica do Emperador Clarimundo* (Coimbra, 1520; and again in 1791), written at the age of twenty, is remarkable for its beauties of style. His great work is the *Asia Portuguesa*, a history of the conquest of the Indies by the Portuguese (3 vols. Lisb. 1552-63), continued by Diego do Couto (Lisb. 1602-45). The latest edition is that of 1778-88; but there is an abridged translation in German by Soltau (Bruns. 5 vols. 1821). B. also wrote the first Portuguese Grammar (Lisb. 1540; new ed. 1785). He died at Alitem, near Villa-do-Pombal, 20th October 1570.

Barro'sa, or **Baross'a**, a village in the province of Cadiz, Spain, 4 miles N. of Algeciras, where Major-General Sir Thomas Graham gained a splendid victory over the French under Marshal Victor, March 5, 1811. Nearly 3000 French were killed and 300 prisoners taken, with 6 pieces of cannon and an eagle.

Barrot, Camille Hyacinthe Odilon, born at Villefort (Lozère), 10th July 1791, educated at Saint-Cyr and the Lycée Napoléon, joined the bar in 1814, and distinguished himself in

the case of the Protestants du Midi. In the Chamber of Deputies he was a foremost Liberal, and though not a Doctrinaire, belonged to the Aide-toi Society. In 1830, along with Maison and De Schonen, B. presented the ultimatum to Charles X. at Maintenon. After holding office for a short time under Lafayette, he became the leader of the moderate 'left' opposed to Casimir Périer, voting for the abolition of the hereditary peerage. He joined the coalition against Molé, supported Thiers, and opposed Guizot. On the eve of the revolution of 1848, B. attempted with Thiers to form a ministry which would have accepted the Count of Paris and a regency. As president of Louis Napoleon's first ministry B. was succeeded by Baroche, and shortly afterwards withdrew from public life. He recognised the value of the right of discussion on home and foreign affairs conceded to the Chambers in 1860, and pointed out that the right of censure implied a responsible ministry. In 1861 he published an important work on centralisation and its effects. In June 1872 he was chosen a member of the Council of State by the National Assembly, and vice-president of the Council on the 27th of July. He died August 6, 1873, and a volume of memoirs appeared in 1875.—**Victorin Ferdinand B.**, brother of the foregoing (born 1806), has also had a political career, but not a conspicuous one. He discussed the Empire, and after serving as ambassador at Turin, became a senator in 1853, and was made secretary of senate in 1865.

Barrow, the *Birgos* of Ptolemy, a river in the S.E. of Ireland, after the Shannon the most important in the island. It rises in the Slievebloom mountains, in the N. of Queen's county, and after an easterly course of 15 miles, and a southerly course of 85 miles, it falls into the estuary of Waterford harbour. It is navigable for large ships up to New Ross, and for barges up to Athy, fully 60 miles from the sea. It has several tributaries, the most important of which are the Nore and the Suir, which with the B. are named the Three Sisters. The Grand Canal connects the B. with the Liffey at Dublin.

Barrow, Isaac, D.D., a celebrated mathematician and divine, was born at London in October 1630. In 1645 he entered Trinity College, Cambridge, where he obtained a fellowship in 1649, and graduated as M.A. in 1652. Though recommended by the retiring professor for the Greek chair, he lost the election on account of his suspected Arminian views. This professorship, however, he obtained in 1660, a few months after his return from the Continent, where he had travelled for four years. He occupied in succession the Gresham chair for geometry and the Lucasian mathematical professorship, which latter he relinquished in 1669, in favour of his pupil Isaac Newton. In 1672 he became the master of Trinity College, and in 1675 vice-chancellor. B. died at London, May 4, 1677. His sermons are remarkable for their vigour, lucidity, eloquence, and length. On one occasion at least, a congregation, after listening for three and a half hours, had recourse in despair to an organ, and 'blowed him down.' B.'s theological works have been edited by Tillotson (3 vols. Lond. 1683; new ed. 1741). There is also a Cambridge edition in 6 vols. (1818), a New York one in 3 vols. (1845), and another by Napier in 9 vols. (1859). His best mathematical works are his *Lectures Geometricæ*, translated by Stone (1735), and *Lectures Opticæ*, by Kirby (1734). The latest edition is that of Whewell (Lond. 1861).

Barrow, Sir John, born at Dragleybeck, Lancashire, June 19, 1764, was first engaged as clerk in an iron-foundry Liverpool, made a voyage in a Greenland whaler in 1780, became mathematical tutor to the son of Sir George Staunton, through whose influence he was appointed private secretary to Lord Macartney in his embassy to China, and afterwards in the governorship of the Cape of Good Hope. He was appointed secretary to the Admiralty in 1804, held the appointment for forty years, and during the whole of that time laboured with enthusiasm and with much success in the interests of geography. To him it is mainly due that the spirit of arctic enterprise was kept in activity during these years, and the earlier polar expeditions of this century owed much to his superintendence. The idea of the foundation of the Geographical Society (1830) originated with him, and he remained its vice-president till his death, 23d November 1848. He was a voluminous writer of travels, voyages, and the memoirs of naval heroes. His books are accurate and agreeable in style. He is chiefly remembered now for his *Chronological History of Arctic Voyages* (Lond. 1818). His *Autobiographical Memoir* was published in 1847.

Barrow-in-Furness, a thriving seaport and manufacturing town in N. Lancashire, on the S.W. shore of the peninsula of Lower Furness, and 18 miles W.N.W. of Lancaster. It is a station on the Furness Railway, and is thus connected with the London and North-Western and the Midland Railway systems. Its charter of incorporation dates from 1867. B. furnishes the most striking instance of rapid growth of any European town of recent times. In 1847 the population was 325; in 1864 it had increased to 10,608; in 1871 to 18,245; and in 1875 to 40,689. The borough is one of the largest in the country, containing no less than 9720 acres. This extraordinary prosperity is due to the abundance in its neighbourhood of rich hematite ore, yielding an average of 57 per cent. of iron, and which has converted a fishing hamlet into one of the most important centres of the iron manufacture in the world. The ore, being almost free from phosphorus, is well suited for the manufacture of steel, which is here produced by the Barrow Hematite Steel Company at the rate of 1000 tons weekly. The process employed is the Bessemer (q. v.). Nearly 500,000 tons of ore are annually required for the blast-furnaces, which, to the number of fourteen, are ranged along the shore. About 20,000 tons of slate, obtained near B., are annually exported. Iron shipbuilding is now carried on to a great extent on Barrow Island. The principal proprietors are the Dukes of Devonshire and Buccleuch, who have formed a harbour and docks at a large expense. There are now four docks—the Devonshire, the Buccleuch, the Ramsden, and the New Ramsden Docks opened in 1878, and covering $7\frac{1}{2}$ acres. In 1876, 1285 vessels entered of 276,105 tons, and 1531 cleared of 338,072 tons. The steam-packets from the Isle of Man and Belfast arrive and depart from Piel Harbour, 2 miles S. of B. The most prominent structures are the steel-works (the largest in the kingdom) and the new jute-works. A handsome bronze statue was erected by public subscription in Ramsden Square in 1872, in honour of Sir James Ramsden, first mayor of the borough, and managing director of the Furness Railway.

Barrow-on-Soar, a village on the navigable river Soar, in the county of Leicester, 10 miles N. of Leicester, and a station on the Midland Railway. A fine blue lime found in the district is converted into a valuable subaqueous cement. The inhabitants manufacture lace and hosiery in their own homes. B. has considerable charitable endowments, two free schools, and an extensive union workhouse. Pop. of township (1871) 1963.

Barrow Point and **Strait**, the former considered the most northerly point of continental N. America, in lat. $71^{\circ} 23' N.$, lat. $156^{\circ} 31' W.$ (see BELLOT STRAITS); the latter being the continuation westward of the passage called Lancaster Sound, S. of the island of N. Devon, and crossing the northern outlet of Regent Inlet, have both been named in honour of Sir John Barrow (q. v.).

Barrow etymologically, is the modern form of the old English *beorh*, first a mound for defence, then a heap or cairn for whatever purpose. The word is not derived, as commonly said, from *byrian*, to bury, but *byrian* is derived from it. B. is now exclusively used to denote a mound of earth or stones raised over the remains of the dead. Though this form of sepulture was specially characteristic of the prehistoric periods, it continued in many parts of Europe down to the introduction of Christianity. In countries that have been long under cultivation, the smaller barrows have mostly disappeared. Yet the number existing in the Orkneys has been estimated by Captain Thomas at about a thousand. In Scotland and Ireland they occur in groups, of which Clava, near Inverness, and Moytura, near Sligo, are examples. The Moytura group consists of upwards of sixty barrows, many of them chambered. Scandinavia and N. Germany are studded with these grave-mounds. Upwards of 100,000 have been enumerated in France. They are numerous in Spain and Portugal. The magnificent chambered B. of Antequera, near Malaga, Andalusia, is one of the most remarkable in Europe. The mound exceeds 100 feet in diameter, its chamber measures 80 feet in length by 20 feet in width, and 10 feet in height. Ten stones on each side form the walls. The end is a single stone, and the roof is covered by five stones, the largest of which is 25 feet long, and 21 feet broad. When the chamber is not of this megalithic construction, the upper portion of the side-walls is built so that each stone projects a little further inward than that below it, thus forming a rude dome-shaped roof.

These dome-roofed chambers are always provided with a passage leading to the exterior of the mound. The great chambered B. of New Grange, on the banks of the Boyne, is the best-known example of this type. It is over 300 feet in diameter, and 70 feet in height. The central chamber is upwards of 20 feet in height, and is approached by a passage 70 feet in length. In Denmark the oblong barrows called 'giants' graves' are most common. They contain chambers of the first-mentioned form, without passages, while the round barrows usually have passages leading into them, but they never have domed roofs like those of Britain. The long barrows of England and Denmark are characteristic of the Stone Age, but the circular form was retained in the succeeding periods, and some of the largest chambered barrows of this form in Scandinavia belong to the latest times of Paganism. It is from the character of the sepulchral deposits, therefore, and not from the external form, or internal construction, that the age of a B. is to be determined. In those of the Stone Age the deposits are usually of unburnt bodies, accompanied with rude, hand-made pottery—the remains of food-vessels or drinking-cups—axes of polished stone, spear and arrow heads of chipped flint, and rude implements and ornaments of bone or stone. Cremation, however, began in the Stone Age, and is found contemporaneously with the deposit of unburnt bodies, sometimes even in the same B. The cinerary urns which accompany interments after cremation are often larger vessels, and usually of coarser make than those found with unburnt bodies. Special forms, however, are peculiar to the two styles of interment, so that the nature of the sepulchral pottery is to a certain extent an index to the form of burial. The barrows of the Bronze Age (in which cremation had largely superseded unburnt interment) are seldom chambered, and the deposit is usually contained in small cists of slabs. The pottery is of finer texture, and exhibits a greater variety of form and ornament than that of the preceding period. Sometimes the urn is found simply inverted over the deposit of burnt bones, without any protecting cist, at other times it is placed upright in a cavity among the stones of the B. The deposits accompanying interments of the Bronze Age are weapons and implements of bronze, and ornaments of bronze and gold, often of exquisite workmanship. Towards the close of the Bronze Age in Central Europe, the size of the B. was greatly reduced, and a custom prevailed of burying in vast cemeteries like that of Hlallstadt (containing upwards of 1000 graves), in which interments of burnt, unburnt, and partially burnt bodies are accompanied by weapons and implements of bronze as well as of iron, in which the forms peculiar to the Bronze Age were for a time reproduced. The barrows of the Iron Age are most numerous in Scandinavia. The Kongs-hol at Upsala in Sweden, and the grave-hills of King Gorm and his wife Thyre at Jellinge in Jutland, are well-known illustrations of the enormous size of the barrows of this period. In the Viking time, the sea-king was placed in his B., seated in his ship, with his arms and accoutrements around him. Sometimes the B. itself was made in the form of a ship, with great stones set for the prow and stern. The *Njal Saga* and the old English poem of *Beowulf* describe instances of B.-burial, and the funeral obsequies performed at the rearing of the barrows of the Homeric period are detailed in the *Iliad* and *Odyssey*. Consult Bate-man's *Vestiges of the Antiquities of Derbyshire* (Lond. 1848); Worsaae's *Primeval Antiquities of Denmark* (Lond. 1849); Macpherson's *Antiquities of Kerloch* (Lond. 1857); Kemble's *House of Feroles* (Lond. 1863); Stuart's Preface to *The Sculptured Stones of Scotland* (Spalding Club, 1867); Thurnam's *Ancient British Barrows*, in *Archæologia*, vol. xliii. (1872); Fergusson's *Rude Stone Monuments*, London, 1872; and Greenwell and Rolleston's *British Barrows* (Oxf. Clar. Press, 1877), a most careful and valuable work.

Barraulet, in heraldry, a diminutive of the bar (q. v.), occupies on the shield the fourth part of the width of the bar, and half that of a Closet (q. v.), the other diminutive.

Bar-sur-Aube ('the stronghold on the Aube'), an ancient town in the department of Aube (Champagne), France, and a station on the railway from Paris to Mulhouse, with considerable trade in wine, corn, hemp, wood, and wool, and some manufacture of calicoes, brandy, paper, tablecovers, and vinegar. It stands on the right bank of the Aube, here crossed by a bridge, from which, at a spot now marked by a chapel, the Bastard of Bourbon was thrown into the river (1440) by order of Charles

VII. On the 25th February 1815, the Allied Powers met at B., and fixed the plan of the war which resulted in the first overthrow of the Empire; and two days later Schwarzenberg gained a decisive victory here over the French under Oudinot and Macdonald. Pop. (1872) 4356.

Bar-sur-Seine ('the stronghold on the Seine'), a town in the department of Aube, France, on the left bank of the Seine, 15 miles S.W. of Troyes, with an extensive wine trade. The Allies, commanded by the Prince of Württemberg, defeated the French here, March 1814. Pop. (1872) 2443.

Barry, Marie Jeanne Gomar de Vaubernier, Comtesse du, the central figure for a time in the licentious court of Louis XV. of France, was born at Vaucouleurs, the birthplace of Joan of Arc, 19th August 1746. Her father was an excise-man of the name of Vaubernier, her mother a dressmaker, named Bécu or Cantigny, who survived till 1788. On the death of her father she went to Paris. There, as a nun, as a servant, and as a milliner, under the name of Mademoiselle Lange, she lived a chequered and disreputable life. At last she became the mistress of the Comte Jean du Barry-Ceres, commonly known as Le Rucé, and one of the rakes of the period. Introduced by him to Lebel, the valet of Louis XV., and by Lebel to the king, her youth, beauty, and somewhat coarse wit, fascinated the sexagenarian voluptuary. She became his favourite, and having gone through the ceremony of marriage with Count Guillaume du Barry, brother to Count Jean, she was in 1769 introduced to the court as Comtesse du Barry. Till the death of the king in 1774 she ruled France, and never was its court so corrupt and shamelessly immoral as under her rule. Although a woman of no refinement or taste in any sense of these words, she yet patronised artists and men of letters, because she feared them. After the death of Louis XV. B. was dismissed the court, and sent to the convent of Port-aux-Dames, near Meaux; and although she was subsequently allowed to live on a pension at the mansion of Luciennes, which the old king had built for her, she never attempted to take part in public life. During the frenzy of the revolutionary period, she was, on the orders of Robespierre, arrested, tried on the charge of conspiring against the republic, condemned, and guillotined 7th December 1793. Of all the female victims of the Revolution, B. alone showed a want of courage at the last, shedding tears on her way to the place of execution, and imploring her life of the mob. See Lacretelle's *Histoire de France pendant le dix-huitième Siècle*; Moutte d'Angerville's *La Vie Privée de Louis XV.* (Lond. 1781); and above all, MM. de Goncourt's *La Du Barry* (Par. 1878), a work of minute and persevering research, to which all sorts of pamphlets, caricatures, vaudevilles, prints, newspapers, and satires have been made to contribute. The so-called *Memoires de Mme. la Comtesse du B.* (Par. 1829-30; new ed. 1843) are believed to be the fabrication of Paul Jacroix and La Mothe-Langon.

Barry, Sir Charles, a celebrated English architect, born in London in 1795, studied his art in England under Messrs Middleton and Bailey, and afterwards travelled over the Continent and part of Egypt to improve and liberalise his knowledge. His first important work of a public character was the Church of St Peter at Brighton, which made so favourable an impression that his design was chosen by the Church Building Commissioners for their seal. Another fine work of B.'s was the Manchester Athenæum, in the Greek style; and a still finer was King Edward VI.'s Grammar School at Birmingham, a Gothic structure. The College of Surgeons, Travellers' Club, and the Reform Club were also constructed from his designs, but the most splendid and enduring monument of his genius is the New Houses of Parliament—'a dream in stone,' according to the happy phrase of the Russian Emperor Nicholas. B. received the honour of knighthood (1842) on the opening of the Victoria Tower, and died at Clapham, 12th May 1860. He was buried in Westminster Abbey.

Barry, James, a painter, born at Cork, October 11, 1741, displayed at a very early age a taste for drawing, and, before he was twenty-two years old, gained the patronage of Edmund Burke, who supplied him with the means of studying art in Ireland. He went to England, and obtained a high reputation by his historical paintings, which were characterised by power if not by delicacy of finish, and of which the *Victors at Olympia* was the chief. B. was made professor of painting at the Royal Academy in 1786, but being a quarrelsome eccentric man, he was removed from the post in 1799, and died in comparative

poverty, February 22, 1806. A writer on art subjects as well as a painter, his collected works with a memoir prefixed appeared in 2 vols. 1809.

Barry, Martin, M.D., F.R.S., an eminent physician and physiologist, was born at Fratton, Hampshire, in 1802, and died at Beccles, Suffolk, 27th April 1855. His *Researches in Embryology* are published in the *Philosophical Transactions* of the Royal Society of London for 1838, 1839, and 1840.

Barry Corn'wall. See PROCTER, BRYAN WALLER.

Bars-Gemelles (Fr. *jumeau, jumelle*, a twin, from the Lat. *gemellus*, a diminutive of *geminus*), in heraldry, twin barrulets—that is, barrulets disposed in couples, or borne in pairs.

Bartan', a town of Anatolia, at the mouth of the Chati-su, or Bartan-su (the ancient *Parthenius*), whose name still survives in that of the town. B. has a good trade with Constantinople. Pop. estimated at 10,000.

Bartas, Guillaume de Salluste du, a Gascon poet, born at Montfort, Armagnac, in 1544. His reputation, brilliant during his lifetime, dimmed shortly after, and now extinct, was based on a long poem on the creation and early history of the world, a work of which thirty editions passed through the press in six years, and which is thought by some critics to have influenced Milton considerably in writing *Paradise Lost*. *La Première Semaine* or *La Création* is considered the best part of the work, while *La Seconde Semaine*, an enumeration of the deeds of primeval heroes, is admitted to be about the worst. B. wrote *L'Uranie* in early youth, in praise of poetry. *Judith*, *La Bataille d'Ivry*, and some pieces addressed to the Queen of Navarre and to King James VI. of Scotland, were quite ephemeral. B. in his poetry indulged largely in the use of compound words, and this led Sylvester (q. v.), his translator, to compound English words, and thus to reduce the expressiveness of the English language. B. was also a soldier and a diplomatist, and died in 1590 of wounds received at the battle of Ivry. The most complete edition of his works is that of 1611.

Barter is the exchange of a commodity for anything except money, the exchange for money being called Sale (q. v.). As civilisation advances, exchange of commodities increases. Each one finds it more profitable to have some fixed employment, and to exchange the produce of his labour for the produce of the labour of others, than to endeavour to make everything for himself. Then the effecting of exchanges becomes itself a business. This business ultimately splits, and we have the wholesale and the retail dealer. While the price of the article is thus increased to the consumer, it is less than he could get it for without the intermediate dealer. Yet in reality B. is not extinguished by this process. The exporter, instead of getting a remittance of money for the goods exported, probably imports a cargo of some other goods, with at least a part of the proceeds of the export; that is, he exchanges on B. It used to be maintained that for the merchant to deal in this way was not conducive to national wealth, and that a cash remittance for the whole value exported was the proper thing. For an exposition of the fallacy of this view, see BALANCE OF TRADE. The simple commercial law is now happily generally understood, in England at least—that *what is best for the merchant is best for the community*.

Bartfeld, an old royal free town on the frontiers of Galicia, in the county of Saros, N. Hungary, on the Tepla, 95 miles N. of Debreczin, noted for its chalybeate springs. It was once an important centre of trade between Galicia and Hungary, and its archives are very rich in historical documents. Even yet it has some trade in wine, brandy, and linen, and many thousands of bottles of mineral water are annually sent to all parts of the country. Pop. 4222.

Barth, Heinrich, a celebrated African explorer, was born at Hamburg, February 16, 1821. He studied at the University of Berlin, specially devoting himself to archaeology and philology, and in 1844 took his degree and crossed to London, there to learn the English and Arabic languages. In 1845 he set out on his first great African journey; explored the entire N. coast of the continent, travelled through Arabia, Palestine, Asia Minor, and Greece, and returned in 1848 to Berlin, where he gave a series of lectures on ancient geography, and published his *Wanderungen durch die Küstenländer des Mittelmeers in den Jahren 1845-47* (vol. i. Berl. 1849). The influence of the

Chevalier Bunsen procured leave for B. and Dr Overweg to accompany the British political and commercial expedition to Central Africa, headed by Mr James Richardson. In 1850 they started from Tripoli, to which B. returned in 1855, after having explored 24 degrees of latitude and 20 of longitude, over 12,000 miles, most part of which had been untrodden ground. He crossed the Great Desert, visited for the first time many native states in the Fellatah country, traced the course of the Niger for several hundred miles, and resided at Timbuctu for seven months. These results are given fully in his *Reise und Entdeckungen in Nord und Centralafrika* (5 vols. Gotha, 1855-58, English translation in 1857-58), a work displaying true German solidity, excelling in a clear perception of things physical, historical, and ethnological. In 1863 B. was made Professor of Geography in the University of Berlin, and President of the Geographical Society. His other works are *Reise von Trapezunt durch die nördl. Hälfte Kleinasiens nach Skutari* (Gotha, 1860); *Reise durch das Innere der Europ. Türkei* (Berl. 1864); and an unfinished *Sammlung und Bearbeitung Centralafrik. Vocabularien* (Gotha, 1862-64). B. died at Berlin, November 25, 1865. See *Life by Koner in the Zeitschrift der Gesellschaft für Erdkunde zu Berlin* (vol. i. part 1, Berl. 1866).

Barth, or **Bart**, **Jean**, the favourite naval hero of France, son of a fisherman, was born at Dunkirk in 1651. He first served in the Dutch navy, was next captain of a privateer, and was then commissioned to cruise the Mediterranean by Louis XIV., who shortly afterwards appointed him lieutenant of a man-of-war. Being made prisoner by a superior English force, he escaped from Plymouth, and reached France after a voyage of nearly 200 miles in an open fishing-boat. For this exploit he was made captain. Eluding the English fleet, which was blockading the French ports, he inflicted much damage on the Dutch; and for this he was appointed to the command of a squadron in 1697. His bluntness, as much as his undoubted skill and courage, made him a favourite with the king. The peace of Ryswick deprived him of further opportunity of signalising himself, and he retired to Dunkirk, where he died, 27th April 1702. See Richer's *Vie de Jean Bart* (Par. 1780), Poirier's *Eloge Historique de Jean Bart*, &c. (1807), and Vanderest's *Histoire de Jean Bart* (Par. 1841).

Barthélemy, **Auguste-Marseille**, born at Marseilles in 1796, studied at the College of Juilly, and early devoted himself to the composition of political satire in verse. Going to Paris (1822), he produced, along with his fellow-townsmen M. Méry, several powerful pieces, such as *Les Sidiennes* (1825), *La Villiade* (1826), *Les Jésuites* (1826), all directed against the Conservative Legitimists, and suggesting regret for the Empire. *Le Fils de l'Homme* (i.e., Napoleon II., King of Rome and Duke of Reichstadt), brought upon B. three months' imprisonment and a fine, just on the eve of the revolution of July, which he and Méry celebrated in *L'Insurrection*, and the sentence itself in *La Bourse et la Prison*. A pension from the Louis Philippe government (speedily withdrawn) did not alter B.'s political principles, or silence his active pen. The fifty-two satires known collectively as *Némésis* and *Nouvelle Némésis* (1834), did not spare the successive ministers who tried to make a good constitution out of a bad charter. Even the comparatively liberal Guizot was scandalised. B.'s latest poem was *Les Deux Marseilles* (1858). He supported the Second Empire, and died librarian of Marseilles, 23d August 1867. His brilliant verses depend chiefly on contemporaneous politics for their interest; but such sayings as '*L'homme absurde est celui qui ne change jamais*,' are more likely to live. B. translated the *Æneid* into French (4 vols. 1835-38).

Barthélemy, **Jean Jacques**, known as Abbé B., was born at Cassis, 20th January 1716. Educated for the Church, he devoted himself to the study of oriental antiquities, especially numismatics. Appointed in 1745 assistant to De Boze in the cabinet of medals, he classified an immense number of these antiquities, including those of the Petterin Collection. The Palmyran alphabet and the mosaic of Palestrine were special subjects of research. In 1788 he produced his celebrated work *Voyage du jeune Anacharsis*, in which, in the form of a narrative of travel through Greece in the 4th c. before Christ, he recorded his immense stock of erudition relating to the ancient world. The best edition of the *Anacharsis* (which was translated into English in 1794, and into German by Fischer and Haupt 1836) is that published by Didot (Par. 7 vols. 1799). See

Villeneuve's *Notice sur les Ouvrages de Jean J. Barthélemy* (Par. 1821), with a valuable atlas. B. died at Paris, 30th April 1795.

Barthélemy-Saint-Hilaire, **Jules**, member of the Institute, was born at Paris, 19th August 1805. Before and after the revolution of 1830 he supported democratic principles in *Le Globe* and *Le Bon Sens*. In 1834 he became a tutor of French literature at the École Polytechnique, and in 1838 Professor of Greek and Latin Philosophy in the Collège de France. B. appeared in the Constituent Assembly of 1848, at first supporting Barrot and the candidature of Napoleon. On the *coup d'état* he refused the oath to the new government, and resigned his chair, to which he was not reappointed till 1862. He was a member of the Corps Législatif in 1869, and was elected in 1871 to the Assembly, where he supported Thiers. Between 1837 and 1846 he translated the *Politics, Logic, and Psychology* of Aristotle into French. He has also written on the Alexandrian School of Philosophy, on the Vedas, on Mohammedanism, and on Buddhism. See his works: *Le Bouddhisme* (1855), *Des Vedas* (1854), *Boudha et sa Religion* (1859, 3d ed. 1862), and *Mahomet et le Coran* (1865).

Barthez, or **Barthès**, **Paul Joseph**, a celebrated French physician, born at Montpellier, 11th December 1734. After serving in the army, he was, in 1759, appointed to a professorship at Montpellier, which soon became one of the most famous medical schools in Europe. In 1781, in consequence of disputes with his colleagues, he removed to Paris, where he was named consulting physician to the king. The revolution deprived him of his places and emoluments, and he left Paris; but he was recalled by Napoleon, who loaded him with wealth and honours. B. died 15th October 1806. Of his works, which are numerous, and on a variety of subjects, the best known are his *Nouvelle Mécanique des Mouvements de l'Homme et des Animaux* (Carcassonne, 1798), and his *Nouveaux Eléments de la Science de l'Homme* (Montpellier, 1778; 2d ed., much enlarged, Par. 1806). See Lordat's *Exposition de la Doctrine Médicale de P. J. B., et Mémoires sur la Vie de ce Médecin* (Par. 1818).

Bartholin, the name of a Danish family, the members of which have distinguished themselves in medical science and literature.—**Kaspar**, born at Malmö, 12th February 1585, studied medicine at Padua, was made Doctor of Medicine at Basel in 1610, became Rector of the University of Copenhagen in 1618, and Professor of Theology in 1624. He died 13th July 1630. Of his forty-nine publications, the most important is his *Institutiones Anatomica* (Wittenb. 1611). He left six sons, all distinguished by their writings. Of these, the most celebrated was **Thomas B.**, born 20th October 1616; became Professor of Anatomy at Copenhagen, 1648; Physician in Ordinary to the king, Christian V., in 1670; Councillor of State, 1675; and died 4th December 1680. Besides his works on purely medical subjects, he wrote valuable treatises on antiquities, and on natural philosophy. He was an ardent defender of Harvey's doctrine of the circulation of the blood. Among his works on biblical antiquities are his treatises *De Morbis Bibliis* (Copenhag. 1672), and his *Disquisitio Medica de Sanguine Vetito* (Frankf. 1673). His sons, **Kaspar B.** (born 1654, died 1704), and **Thomas B.** (born 1649, died 1690), were also distinguished—the one as an anatomist, and the other as an antiquarian.

Bartholomew Fair, formerly an important market, associated in various ways with the literature and history of England, was first held at West Smithfield, London, in 1133, under charter granted by Henry I. to a monk named Rayer or Rahere, at one time a court fool, but subsequently the founder of St Bartholomew's Church and Priory, and also of the famous Hospital of the same name. The fair continued to be held annually on the 24th of August, the festival-day of St Bartholomew, and in addition to the usual buying and selling, soon became remarkable for the miracle-plays, mysteries, and the later moralities performed by the monks of the adjoining priory, for athletic sports and popular games, and for the public disputations and rhyming contests of the scholars from the various London schools. In the 14th and 15th c. it was one of the most flourishing fairs in England, chiefly for cattle, cloth-stuffs, leather, and pewter, and was a great place for theatrical booths, shows, exhibitions, mountebanks, acrobats, &c. The priory was abolished on the suppression of religious houses by Henry VIII. in 1546, and the hospital, along with the charter, was transferred to the London corporation. The fair now began to decline as a

place of traffic, and towards the end of the 16th c. a street of houses was built on the site of the Cloth Fair, a name which the street still retains. Ben Jonson's play of *Bartholomew Fair*, which was produced in 1614, gives a vivid picture of the jumble of the old gathering. In 1593, the year of the great plague, for the first time the fair was not held, and for various reasons it was also postponed in 1603, in 1625, in 1630, in 1665, and in 1666. Hitherto it had usually lasted only three days, but after the restoration of Charles II. it was prolonged to a fortnight. So much, however, had it lost its character for trade, that it was found necessary to restrict it to three days in 1691, and also, its duration having again increased, in 1700. It had been already represented as a nuisance in 1701, and the traffic now rapidly declining, it soon became a yearly spectacle of riotous amusement and debauchery. The fair was removed to Islington in 1840, where it feebly struggled for existence, till it was finally abolished in 1855. See Henry Morley's *Memoirs of B. F.* (Lond. 1859, new ed. 1874).

Bartholomew, St., one of the W. India islands, lies among the most northerly of the Lesser Antilles, about 25 miles S. of the British island of Anguilla. It exports sugar, tobacco, cotton, and cocoa, and is the only colonial possession of Sweden, to which country it was ceded by the French in 1784. Chief town, Gustavia. Area, 80 sq. miles; pop. (1875) 2394.

Bartholomew, St. (Heb. 'son of Talmai'), one of the twelve apostles, is conjectured to have been Nathaniel, because the latter seems to be ranked as an apostle in John xxi. 2; he was brought to Jesus by Philip (John i. 45-50); and in the catalogues given by the evangelists B. and Philip are always put together. Of his subsequent history there are nothing but vague traditions. In the Latin Church his festival is held on the 24th of August; in the Greek Church, on the 11th of June. A spurious gospel with his name was among the Apocryphal books condemned by Pope Gelasius. See APOCRYPHA.

Bartholomew's, St. Day (called by the French *La St Barthélemy*), is the day which has given name to the massacre of the Huguenots at Paris on 24th and 25th August 1572, and following days. A great number of Huguenot noblemen and their followers had come to Paris to celebrate the marriage of Henry of Navarre (a Protestant leader) with Margaret, youngest sister of Charles IX., which took place on 18th August. On the 22d an attempt was made to murder the Admiral Coligny. This may have caused disturbance among the Huguenots (the despatches to the Protestant princes of Germany alleged this as an excuse for the massacre), but, from whatever cause, the King was, on the 23d, persuaded by Catherine of Medici, his mother, the Duke of Anjou (afterwards Henry III.), his brother, Tavanne, De Retz, Birague, and Nevers, to consent to a general massacre. The instructions were given to the French and Swiss guards, and to the civic authorities, by Guise, whose father had been murdered by Huguenots. Besides Coligny, Rochefoucault, Teligni, Ramus the philosopher, and De la Place the jurist, all the leading Huguenots, and all those in Paris, were murdered. The massacre was repeated at Meaux, Orleans, Lyons, and elsewhere, on a smaller scale. In six weeks 50,000 Huguenots are supposed to have been killed. On the 26th the King stated to the Parliament that he was responsible for what had been done. Philip II. warmly approved of, and offered to assist, the process of extermination. Pope Gregory XIII. (following the traditions of Pius V., who had opposed the Jesuits to the Huguenots), went in solemn thanksgiving to the Church of San Luigi, and had a medal struck in commemoration of the event. It was thought at one time that the massacre had been planned by Catherine (the queen-mother) and Alva, at a meeting which took place at Bayonne in 1564, shortly after the edict of Amboise; and that Charles, in signing the Edict of Pacification of St Germain-en-Laye (1570), and in receiving Coligny at Paris, was acting a part. The true view seems to be that a liberal Catholic party had been formed, consisting of L'Hopital, Montmorency, &c., who, along with Coligny, desired to break with Spain and assist William of Orange. It was Montmorency who arranged the pacification. Charles, impatient of his mother's restraint, at first sided with this party, made a treaty with England, and sent Genlis to Flanders. Latterly he became jealous of the influence of his brother Henry with the old Catholic party, and wavered round at the last moment, in the hope of making his own position more secure. As regards the extent and ferocity of the

massacre, it must be remembered that a long civil war, marked by atrocious cruelty on both sides, had just been raging all over France. It is impossible not to connect it partly with the rapidly-growing influence of the Jesuits, of whom Augier and Maldonet had just become famous in Lyons and Paris. See Audin, *Histoire de la Saint Barthélemy d'après les Chroniques et les Manuscrits du 16^{me} Siècle* (Par. 1829); Soldan, *Hist. of Protestantism in France to Death of Chas. IX.* (1855); and Ranke, *Civil Wars and Monarchy in France in 16th and 17th Centuries*, translation by Garvey, 2 vols. Lond. 1854.

Bartholomew's, St. Hospital, Smithfield, London, originally part of a priory for black canons, founded in 1102 by Rahere, a jester at the court of Henry I., was established for a master, eight brethren, and four sisters, who were to take charge of those who needed its benefits. Henry VIII. granted it a new charter, and the endowment was enlarged by Edward VI. There are now over 600 beds, and 70,000 patients are relieved annually. The medical school attached to it is deservedly famous.

Bar'tizan, a small, overhanging turret projecting above doorways, as well as from the angles and other parts of mediæval buildings.

Bartlett, William Henry, artist and author, born in London, 29th March 1809, became a pupil of the architectural antiquary Mr John Britton, and after a time was employed to make finished drawings from nature for the *Cathedral Antiquities* and the *Picturesque Antiquities of English Cities*, which have made the name of Britton famous. B. supplied the illustrations from nature of a work on Switzerland, to which Dr Beattie, his friend, and the companion of his travels, contributed letterpress. Similar works, the result of the same copartnery, were subsequently published with great success, the subjects being the Waldenses, Scotland, Ireland, Holland, Turkey, America, &c. Later, B. wrote his own descriptive matter for his pictures, the chief of his works which he thus illustrated with both pen and pencil being *Walks about Jerusalem*, *Forty Days in the Desert*, *The Overland Route*, *Footsteps of our Lord*, *Pictures of Sicily*, and *The Pilgrim Fathers*. He died 12th September 1854, on his passage by steamer from Malta to Marseilles.

Bartolini, Lorenzo, an Italian sculptor, born at Vernio, Tuscany, in 1777, studied in Paris, and at the beginning of the present century carried off the second Academy prize by his basso-relievo *Cleobis and Biton*, which in ideal purity and simplicity is said to be unsurpassed by Canova. This work established his reputation, and Napoleon, Denon, and others, gave him commissions. Among the works executed by him in France were the colossal bust of Napoleon now in the Louvre, and a magnificent statue of the Emperor, never delivered to government owing to the affairs of 1815, and now in America. On the fall of the Empire, he returned to Florence, where he executed numerous busts, and the groups of *Charity*, *Hercules and Lycus*, &c. In 1845 he produced the *Nymph and Scorpion*, a delightful picture in marble, proving in its beauty that age had not dulled his genius. B. died 20th January 1850.

Bartolomeo, San, a town in the province of Benevento, S. Italy, on a branch of the Fortore, about 50 miles N.E. of Naples. It stands in a hilly region, and has a pop. of 5400.

Bartolozzi, Francesco, an Italian engraver, born at Florence in 1730, came to London in 1764, and was invited in 1806 to Portugal, where he obtained an appointment and a pension from the King, and died April 1813. Of great taste, invention, and talent, the fame of B. at one time eclipsed that of almost all rivals. His engravings are very numerous (over 2000); but among the best known are his *Dion*, after Cipriani; *Silence*, *Birth of Pyrrhus*, &c., after Carracci; *Massacre of Innocents*, after Guido; and *The Death of Chatham*, after Copley.

Barton Beds. See BACSHOT BEDS.

Barton, Bernard, an English Quaker poet, born in London, 31st January 1784, became a clerk in Woodbridge Bank in 1810, and continued in this employment till within two years of his death, 19th February 1849. His *Metrical Effusions* (1812), *Poems by an Amateur* (1818), *Poems* (1820), and *Napoleon and other Poems* (1822), gained for him considerable reputation, and the friendship of Southey, Lamb, and Byron. Later works are *The Reliquary* (1836) and *Household Verses* (1845). There is a sweet and gentle purity in B.'s verse which wins respect, but his genius, though true, is not strong. *Selctions*

from the *Poems and Letters of Bernard Barton* were published by his daughter in 1849. See *Gurney's Memorial of Bernard Barton* (Lond. 1847).

Barton, Elizabeth, or the Holy Maid of Kent, was in the year 1525 a barmaid at Adlington, and subject to epileptic fits. A priest named Master persuaded her that she had divine visions. She joined a nunnery, where Fisher, More, and others, saw her and believed. In 1533 she announced a divine message that, unless Henry VIII. forbore from his divorce from Catherine and marriage with Anne Boleyn, 'he should not be king one day, and should die a villain's death.' On arrest, B. confessed her imposture, and was beheaded (21st April 1534), with five priests, her accomplices. She was probably as much sinned against as sinning. For opposite views, see Burnet's and Lingard's Histories.

Barton-on-Humber, an ancient market-town in Lincolnshire, 6 miles S.W. of Hull. Its ferry, referred to in Domesday Book, had its tolls fixed in the reign of Edward III., but the altered conditions of locomotion have caused it to be disused, and another to be established 6 miles farther down the river. B. has a trade in corn and malt; manufactures of bricks, tiles, pottery, ropes, sacking, and sailcloth; and quarries of oolite and chalk. The tower of St Peter's Church was built, it is thought, before the close of the 11th c. St Mary's is a large and beautiful structure of the 14th c. Pop. (1871) 4332.

Baru, a woolly substance found at the base of the leaves of *Saguerus saccharifer*, one of the sago-palms of the Malay Archipelago. It is used to caulk ships, stuff cushions, &c.

Baruch (Heb. 'blessed'), the friend and amanuensis of Jeremiah (Jer. xxxii. and xxxvi.), was thrown into prison along with that prophet, where they remained till the capture of Jerusalem by the Chaldeans, B.C. 586. On their release, he first resided with Jeremiah at Mizpah (*Jos. Ant. x. ix. 1*), and then accompanied him to Egypt (Jer. xliii. 6, 7). According to one tradition, he died there; according to another, in Babylon.

Baruch, Book of, one of the Apocryphal books, professing to have been written by B., the friend of Jeremiah, in Babylon, about B.C. 581, although it contradicts this itself (cf. B. i. 2, and Jer. xliii. 6, 7). It divides itself into two parts: the first (i.—iii. 8), from its style, seems to be a Greek translation of an original Hebrew text; the second is in good Alexandrian Greek. The book as it now exists probably dates from about B.C. 160. At the end of B. in the Vulgate (6th chap. in English version) there stands a pretended letter of Jeremiah to the exiles in Babylon against idolatry, which may probably be assigned to the 1st c. In old MSS. of the LXX it stands after Lamentations.

Barwood, or **Camwood**, the wood of *Baphia nitida*, a large Leguminous tree growing on the tropical coasts of W. Africa. The wood is very dense, and of a deep-red colour. It is imported in considerable quantities from Sierra Leone as a dye-wood, yielding a bright, but rather fugitive red.

Baryta. See **BARIIUM**.

Baryton (Ital. *viol di Bardoni*), an obsolete musical instrument. It had a finger-board, and seven strings played on by a bow, and under the neck were other strings which could be sounded by the fingers.

Bas, or **Batz**, one of many small French islands in the English Channel, lies 3 miles N. of Roscoff, department of Finisterre. It is 3 miles long and 2 broad. B. has a lighthouse standing 223 feet above the sea, and is strongly fortified.

Basalt, a variety of igneous or volcanic rock of a dense compact texture, dark-green or black colour, composed of very minute crystals of augite, Labradorite, and magnetic iron, with frequently crystals of olivine. The composition of basalts, however, vary considerably, and the name is given to rocks more according to their external characteristics than on account of their intimate structure. To any compact, dark-coloured, igneous rock of recent or Tertiary origin, the name B. is frequently applied, and rocks of similar appearance and structure of more ancient date are known as Melaphyre. Dolerite and anamesite are also rocks which differ only from B. in the size of the crystals of which they are composed. Basaltic rocks occur either in the form of intrusive dykes or narrow sheets shot up through pre-existing deposits, of tabular sheets intruded horizontally between beds already formed, or of contemporaneous sheets poured out over the surface of the ground. It is only in the latter case

that the rock affords direct evidence of its age, as it must have been formed later than underlying and previous to superimposed strata. Basaltic rocks are especially characterised by their tendency to assume a columnar form, magnificent examples of which are afforded by the Giant's Causeway in Ireland, Fingal's Cave, off the west coast of Scotland, and Samson's Ribs, in the neighbourhood of Edinburgh. The columns are sometimes easily separable, and divided by transverse joints, as in the case of the Giant's Causeway; at other times they are firmly embedded in a rocky matrix. In chemical composition the B. of Fingal's Cave contains per cent. 47.80 of silica, 14.80 of alumina, 13.08 of oxide of iron, 12.89 of lime, 6.84 of magnesia, and small proportions of potash, soda, and manganese. Owing to its hardness and power of resistance, B. is well suited for street paving and road metal, but it is not in any favour as a building material. Some ancient Egyptian statues carved out of B. exist. Messrs Chance of Birmingham at one time made a dark-coloured glass by melting the Rowley Rag B.

Bas'inet. See **HELMET**.

Base, in architecture, one of the three parts of a column, which consists of B., shaft, and capital. It is divided into the plinth and mouldings, the chief of the latter being the torus. The Grecian Doric is the only one of the classical orders which has no B. The proportion of the height of the B. to the lower diameter of the shaft varies considerably, but it is most frequently about the half of that diameter.

Base, in chemistry. See **BASES**.

Base, in heraldry, the lower part of a shield or escutcheon, technically distinguished from the *side* and the *chief*. It is divided into the dexter or right, the middle, and the sinister or left B.—the right and left being those of the wearer of the shield, not of the spectator. A charge placed on any part of the B. is said to be *in B.* See **SHIELD**.

Base, in surveying, is a line very carefully measured, the length of which is used as a starting-point in the calculation of the lengths of the other lines in the survey by means of measured angles. The original B. for the Ordnance Survey of Great Britain was measured upon Hounslow Heath. Other bases have also been measured upon Salisbury Plain, at Bellhelvie Links, Lough Foyle, &c.

Base-Court (Fr. *basse-cour*), an outer yard or court of a feudal mansion for stables and the accommodation of servants. It was distinct from the chief quadrangle in front.

Base of Operations, a military term denoting a port, a stretch of sea-coast, a river, or mountain range, on which the general of an army can rely as a magazine for supply of food, forage, and ammunition; a place for retreat after disaster, and to which the sick and wounded may be sent; the end of a line of open communication to which fresh troops may be sent, and from which they can safely advance through a hostile country, or any other similar necessity to an invading army.

Bas'edow, Johann Bernhard, properly **Johann Berend B.**, was born at Hamburg, 8th September 1723, studied philosophy and theology at Leipsic (1744-46), was first a private tutor in Holstein in 1753, became a teacher in a *Ritterschule* at Saröe, and in 1761 was transferred to the gymnasium at Altona. The reading of Rousseau's *Emile* (published 1762) inspired him with a desire to revolutionise the methods of instruction followed in the schools of Germany, and he issued the prospectus of an *Elementar-Werk*, which excited much enthusiasm. The work was published, with pictorial illustrations, in 1774. Called to Dessau (1771), he established there (1774) a *Philanthropin*, or boarding-school, the pupils of which were to be disciplined in all studies—physical, intellectual, and moral, while the textbooks were to be 'free from those theological peculiarities which separate Christians from Jews, Mohammedans, deists, and dissidents, or, as they are called in some places, heretics.' In 1778 he withdrew from the institution. The remainder of his life was devoted to the propagation of his educational ideas through numerous writings. He died at Magdeburg, 25th July 1790. It is difficult merely to praise so one-sided a man as B.; yet such was his intellectual ardour that he often threw out ideas and suggestions the value of which has since been recognised. The deeper study of the mother-tongue, the introduction of modern languages, and the extension of realistic instruction, can be

partly traced to this pedagogic Ishmaelite. B.'s idea that education should be something real and living, something more than the meagre fare of the old classicists, has been enforced anew in the present day, with more genius and learning, by his great-grandson Professor Max Müller. See Rathmann, *Beiträge zur Lebensgeschichte B.'s aus seinen Schriften und andern echten Quellen* (Magdeb. 1791); and Meyer, *Charakter und Schriften B.'s* (2 vols. Hamb. 1791-92).

Basel (Fr. *Basle*, or *Bâle*), a canton and city of Switzerland. The canton, bounded by Aargau, Solothurn, and Bern, by France and by the Rhine, has an area of 177 sq. miles, and was divided in 1833 into two half-cantons, *Basel-stadt* or *Basle-ville* (Basel-city), and *Basel-landchaft*, or *Basle-campagne* (Basel-country), the respective populations of which in 1870 were 47,760, and 54,127. B.-city consists of the city and two small districts N. of the Rhine, with a strip adjoining the city walls on the S., while the rest of the canton forms B.-country. The canton, stretching on the N. slopes of the Jura, here called Hauenstein, is, in the main, hilly; the district in the neighbourhood of the city is fertile in corn and wine, and much of the remainder is rich in pasture-land. The inhabitants are employed in agriculture, the breeding of cattle, and in fishing; ribbons are largely manufactured, and there are besides manufactures of woollens, linens, paper, and leather.

The city of B. had its origin in the fortress *Basilia* (first mentioned 372 A.D.), about 4 miles from Augusta Rauracorum, whose name still survives in the two villages *Kaiser-Augst* and *Basel-Augst*. In 406 B. came under the power of the Alemanni, in 500 under that of the Franks, and at the division of the Frankish empire in 843 it fell to Ludwig the German. It was rebuilt by the Emperor Heinrich I., after its destruction by the Magyars in 917; next belonged to Burgundy for a time, and in 1032 again formed part of the German empire. The burghesses gradually restricting the power of the bishops and the nobles, and conquering or purchasing adjoining districts, raised B. to the rank of a free city. In consequence of continual feuds with the house of Hapsburg, it terminated its connection with the empire, and joined the Swiss Confederacy in 1501. In 1527 it adopted the reformed doctrine, and after some years the bishop and chapter left the city, and the convents were suppressed. The burghess element was now triumphant, and such of the nobles as did not emigrate, had no privileges over the simplest citizen. Occasional disturbances, caused by the undue assumption of authority by the magistrates, alone varied the orderly and industrious citizen-life. The city governed the whole canton, with little regard to the wishes and interests of the country district, the natives of which saw themselves systematically excluded from all the higher offices, while proper educational appliances were denied them. Hence there was continual, though abortive, rebellion, and in 1831 a civil war broke out, the result of which was the separation of the city and country districts into sovereign half-cantons in 1833, as stated above. The capital of B.-country is Liestal. By the federal constitution, proclaimed 29th May 1874, B.-city sends two, and B.-country three, members to the National Council. B.-city has 34,457 Protestants, 12,301 Roman Catholics, 496 belonging to other Christian denominations, and 506 Jews. B.-country has 43,523 Protestants, 10,245 Roman Catholics, 228 belonging to other Christian denominations, and 131 Jews. The Protestant and Roman Catholic clergy are alike paid by the state. The population of B. has gradually diminished, one of the causes assigned being the difficulty experienced by a stranger in becoming a burgher, and liberty to carry on trade being restricted to burghers. B. is divided by the Rhine into Great and Little B. The cathedral, built in 1019, contains the tomb of Erasmus, and there is a bridge over the Rhine built in 1226. The University of B. (founded 1459) has a valuable library, and numerous paintings by Holbein. There is also a public library containing 70,000 volumes. Euler, and the three Bernouillis, were natives of B. See Ochs, *Geschichte der Stadt und Landschaft B.* (8 vols. Bas. 1796-1822).

Basel, Council of, called by Pope Eugenius IV., in accordance with the 'caput Frequens' of the Council of Constance, met 7th December 1431, the Pope being represented by the Cardinal Julian. (It had been originally called by Martin V., avowedly for the reconciliation of the Hussites and of the Pope with the Emperor.) In April 1432, Eugenius dissolved the Council, and called another at Bonn, on the ground that the

union with the Greek Church (then under negotiation with John Palæologus) could be more conveniently treated there. The Council, which had previously renewed the declarations of Constance as to the necessity of frequent councils, and asserted its supremacy in questions of faith, extirpation of heresy, and reformation of the Church (even of its head), now passed their 'caput Considerans,' declaring the dissolution null, which, like most of their proceedings, was immediately notified to the Emperor Sigismund, Charles VII. of France, &c. In succeeding sessions they prohibited Eugenius from making or publishing cardinals or promoting to cathedrals, directed him to recall his denunciations of Sigismund (who had threatened to refuse papal coronation), and declared that, in the event of a vacancy, the election of a new Pope would take place in the Council. They further summoned Eugenius and all cardinals to B., pronounced them contumacious on non-appearance, and finally, by the famous caput 'Sancte Catholica, nisi intra 60 dies,' they suspended the Pope from office, and advocated all ecclesiastical causes to themselves. Owing chiefly to the intervention of Sigismund, Eugenius at last (1433) issued his bull, 'Dudum Sacrum,' recalling his dissolution, and confirming the acts of the Council. This had been preceded by a 'Formula of Adhesion.' In the meantime the Council had granted the use of the cup to the Calixtine Hussites, and now proceeded to abolish the right of *annates*, and the right of presentation to non-Roman benefices, and to pass a number of reforming measures affecting the elections and the internal administration at Rome. A strange rivalry then arose between Pope and Council, each striving to conduct the Greek union affair. The Greeks naturally wished a meeting in Italy, and Eugenius accordingly translated the Council from B. to Ferrara, where, and at Florence, he proceeded to transact business, declaring all subsequent edicts at B. to be worthless, and especially attacking that by which the C. of B. had pronounced their independence of the Pope as regards translation or prorogation to be 'fidei catholica.' Several articles of union were arranged with the Greeks, the difficulties being the power claimed by Eugenius of holding councils in the absence of emperors and patriarchs, and the appeals to Rome. The C. at B. now formally deposed Eugenius as guilty of simony (this was the specified penalty of his refusing to recognise the abolition of *annates*), and elected Amadeus VIII. of Savoy, a feeble recluse, who assumed the name of Felix V. He was recognised by France, Arragon, and Milan, and several of the great universities, but not by the Nürnberg Diet. Cardinal Julian went back to Italy, and Cardinal Allemand took his place. On the death of Sigismund, the new emperor, Friedrich III., exerted himself against the Council, which held its last session 16th May 1443 at Lausanne. Eugenius died in 1447, and chiefly by the intervention of Charles VII., the few remaining fathers were in 1449 reconciled to the new Pope, Nicolas V., Felix immediately resigning. The decrees of this Council, subsequent to the 'translation,' were afterwards condemned by Pius II.; the earlier, or reforming decrees, though not accepted by the Church universal, have been much deferred to in France and elsewhere, Bossuet maintaining their necessary connection with the decrees of Constance in his *Defence of the Gallican Declaration of 1682*. See Messenberg, *Die Allgemeinen Concilien des 15 und 16 Jahrh.* (Const. 1840); and Voigt, *Enea Silvio, als Papst, Pius II. und sein Zeitalter* (Berl. 1856).

Basel, Treaties of, two, concluded at Basel, 5th April and 22d July 1795; the first between the King of Prussia and the French Republic, by which Prussia withdrew from the coalition against France, and ceded to France her trans-Rhenane possessions; and the second between France and Spain, by which Spain ceded to France her portion of St Domingo.

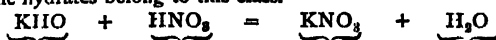
Basell'a, a genus of tropical climbing-plants allied to the natural order *Chenopodiaceæ*. One species yields a purple dye, another furnishes an edible root, while others are used as pot-herbs. They are often grown as ornaments in greenhouses.

Basement Story. See STORY.

Bases are substances which combine with *acids* to form *salts*. The aqueous solution of soluble bases, as a rule, restore the blue colour to litmus reddened by acids, change purple cabbage infusion green, and yellow turmeric solution brown. Some bases combine directly with acids to form salts. This is the case with ammonia, strychnine, brucine, quinine, &c. Thus—



Others in combining with acids give rise to the formation of water in addition to the salt. Potash, lime, baryta, and most metallic hydrates belong to this class.



Caustic potash. Nitric acid. Nitrate of potash. Water.

Ba'han was part of ancient Palestine, to the E. of the Jordan, and was famous for the excellence of its pastures. It stretched from the brook Jabbok—the 'border of Gilead'—on the S., to Mount Hermon on the N. The Jordan was its western boundary, and its eastern the Syrian plateau. Ashtaroth and Edrei were the chief cities of B. under the Amorites, whose last king, Og, with all his sons, was slain near the latter city by the invading Israelites. The half-tribe of Manasseh settled in this fertile country. In the Greco-Syrian period it was divided into four provinces, Gaulanitis, Auranitis, Trachonitis, Batanæa—the name of the latter province, which belonged to the tetrarchy of Philip, and afterwards to that of Agrippa II., being a Græcised form of B.

Bashaw, a Turkish corruption of the Persian *Pasha* (q. v.).

Bashi-Bazouks, irregular troops in the service of the Sultan of Turkey, drawn principally from Asia. They formed a contingent during the Russian War, 1853-56, but though making excellent light cavalry, their predatory habits made them as formidable to their friends as to their enemies. In 1855 General Beatson undertook to collect and discipline a corps of B.-B., but peace being soon after concluded, their military capacity was not tested. Dr William II. Russell describes them as 'picturesque-looking scoundrels.'

Bashi' Islands, some eight in number, form the most northerly group of the Philippines, in the E. Indian Archipelago, and lie 120 miles S. of Formosa. Dampier discovered them in 1687, and named them from an intoxicating drink (*bashi*) used by the natives. Since 1783 they have belonged to Spain. The exports are sugar, hemp, and tobacco. Pop. about 8000.

Basidoh, an important British shipping station on the island of Kishm (q. v.), at the entrance to the Persian Gulf.

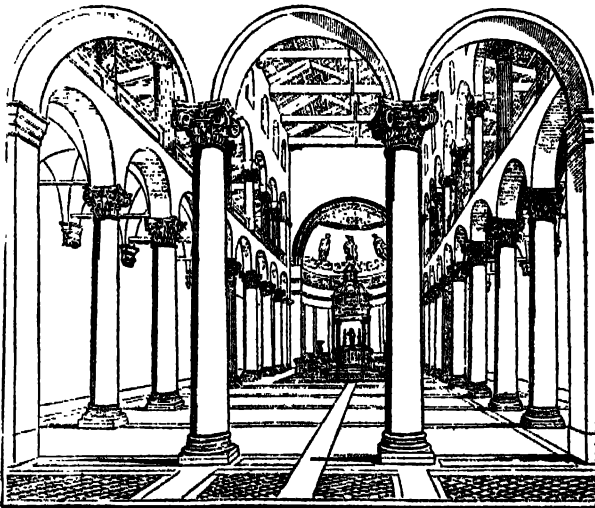
Basien'to, a river of S. Italy, which rises in the Apennines, flows in a southerly direction, and, after a course of 85 miles, enters the Gulf of Taranto, near the ruins of ancient *Metapontum*, and 25 miles W.S.W. of the town of Taranto.

Bas'il, the common name for *Oryzum Basilicum*, a dwarf plant belonging to the natural order Labiate. It is generally cultivated as an aromatic pot-herb, and is used for flavouring dishes.

Bas'il I., founder of the Macedonian dynasty of Byzantine emperors, was born in 813 or 826. Gibbon narrates with incredulity the story of his descent from the Persian Arsacidæ (q. v.). What is certain is that B.'s father was a small farmer near Adrianople, and that B. himself was carried off in infancy during an irruption of the Bulgarians, and was brought up as a slave in a foreign land. While still a youth he escaped with other Roman captives, and repaired to Constantinople, where in 854 he became chief chamberlain to the Emperor Michael III., whose concubine he married. He was created Augustus about 866, and having discovered that the Emperor had resolved on his destruction, B. caused him to be murdered, 24th September 867, and thenceforth ruled alone. His career as a sovereign is incomparably nobler than his life as a courtier. Gibbon (*Decline and Fall of the Roman Empire*, chap. xlviii.) finely expresses the difference: 'His aspiring genius stooped to the arts of a slave: he dissembled his ambition and even his virtues, and grasped with the bloody hand of an assassin the empire which he ruled with the wisdom and tenderness of a parent.' To terminate religious disturbances, he removed Photius from the patriarchal throne, and put Ignatius in his place. He reconquered Asia Minor from the Arabs, expelled their co-religionists from Italy, and displayed the greatest skill in the civil administration of the finances and of the laws. In February 886 B. died of wounds received while hunting the stag. There have been several editions of his *Capit. Exhortationum*, in sixty-six short chapters, addressed to his son Leo.

Basil, St. surnamed the Great, Bishop of Cæsarea, was born at Cæsarea in Cappadocia in 329, and was one of the most eloquent and spiritual of the Christian fathers. After studying at Antioch and Constantinople, he went to Athens, where he formed a friendship with Gregory Nazianzen. He was at one with the latter in his opposition to the Arians, for which he was for a time persecuted by the Emperor Valens. He founded a system of monasticism, by the austerities of which he probably shortened his life. B. succeeded Eusebius as Bishop of Cæsarea in 370, and died 1st January 379. So universally was he beloved that pagans and Jews vied with Christians in the expressions of grief; and in truth, the whole patristic age does not show a finer nature, one in which wisdom, tact, tenderness, toleration, and piety were more exquisitely blended. The first edition of his works, in Greek, appeared in 1532. Subsequent editions are those of Bale (1551), Paris (both in Greek and Latin, 1618), the *Benedictine* (Par. 1721), of which a new and fine edition was published by the MM. Gaume (Par. 1839). A complete translation of B.'s works into French by M. Rouston was published at Paris in 12 vols. in 1847.

Basil'ica, from the Greek *basilikè*, a royal residence, although there is no account of any 'royal residence' in Greece specially known by that name. The building in Athens called the *Basileios Stoa*, or Royal Portico, seems to have been, as to the purposes for which it was used, very much like a Roman B. This edifice contained the court of the Archon Basileus, and the Areopagus occasionally held its sittings there. The Romans, among whom the B. gained that prominence which has rendered it an object of historical importance, gave the name to public buildings with spacious halls, often surrounded with wide porticos, many of which were built at different times in the various forums of Rome, and which, in addition to their original uses as courts of justice, became market-places and mercantile exchanges. They were usually named after the person who caused them to be built, as the B. *Æmiliana*: the B. *Porcia*, mentioned under date B.C. 182, is the earliest on record. The principal feature of the B. was a large roofed building, supported on columns. The roof, or *testudo*, rose high above the other parts of the structure, which consisted of two galleries, placed one above the other, and round the internal sides of the central building. Each gallery, or *porticus*, was covered with a lean-to roof, the upper part of which commenced below the capitals of the columns which supported the *testudo*. The earliest basilicas were open, end and side, to the air; hence an instruction of Vitruvius that the B. ought to be built 'on the warmest side of the forum, that those whose affairs called them there might confer



Basilica of St. Agnese at Rome.

together without being incommoded by the weather.' Latterly a wall, with the columns externally enclosed in it, surrounded the building. Internally, a raised platform at the end of the central part of the building—that portion of it which was covered by the

testudo—served as the magistrate's tribunal. The light was admitted between the spaces formed by the under line of the architrave of the *testudo*, the upper line of the lean-to roof of the *porticus*, and the perpendicular lines of the columns. The B. of Trajan is the only one in Rome of which any considerable remains are left. The most perfect B. of antiquity exists in Pompeii; it is built on the S.W., the warmest side of the forum. The early Christian churches were constructed after the model of these familiar buildings. The space under the *testudo* became the nave, the lateral galleries, or *porticus*, became the side-aisles, and the magistrate's tribunal the Apse (q. v.). There are several churches in Rome each still named a B., the oldest of which, that of S. Pietro, is said to have been built by Constantine on the site of the circus of Nero. Throughout Italy, also, many of the principal churches retain in the name an evidence of the original model after which they were built. The Roman B. is, in fact, the form from which all Christian church-building arose. See Lübke's *Geschichte der Kirchen Baukunst des Mittelalters* (Leips. 1865), translated into English by Wheatley, with appendix and 184 engravings; 2d ed., Thos. C. Jack, Edinb. 1873.

Basilica, a digest in Greek of the Latin *Corpus Juris* of Justinian, made under the superintendence of three of the Greek emperors at Constantinople—Basil I., after whom it is supposed to have been named; his son, Leo VI., the Philosopher; and Constantine VII., Porphyrogenitus, who reduced it to its present form in the early part of the 10th c. From that time the B. was used as a code of jurisprudence in the Grecian empire. Fabrot's edition (Par. 1674) and Heimbach's (Leips. 1833-50) are the best; but the latter contains various readings obtained by the collation of several MSS. not examined by Fabrot.

Basilicata, a province in S. Italy, extends N. from the Gulf of Taranto, and is traversed by the Apennines. It is well watered, and abounds in fertile valleys, but the roads are bad, and earthquakes are frequent. The chief products are corn, wine, tobacco, hemp, and liquorice. Area 4122 sq. miles; pop. (1872) 508,880. Potenza (q. v.) is the capital.

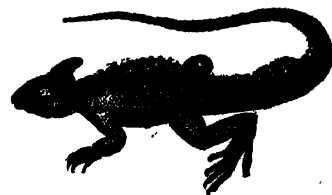
Basilicon Do'ron (Gr. 'royal gift'), a prose work of James VI., containing instructions to his son, Prince Henry, first printed in 1599; reprinted in London in 1603; translated into Latin verse by Henry Peacham, 1604; paraphrased in English and Latin verse by William Wilymat; and translated into French by Villiers Hotman. It is divided into three books; the first treating of a king's duty towards God; the second, of his duty in his office; and the third of his behaviour in things indifferent. The Synod of St Andrews censured the B. D. on account of the doctrines it contained on church government.

Basilicon Ointment, is a popular name for the official ointment of resin. Its constituents vary in different countries. The chief ingredients are resin, wax, lard, and almond oil. It is employed as a stimulating application to foul and indolent ulcers.

Basilides, one of the earliest Egyptian Gnostics, flourished at Alexandria in the first half of the 2d c. His system of doctrine, by which he sought to account for the origin of evil, was compounded of materials borrowed from the Pythagorean philosophy, oriental tradition, and the Jewish and Christian religions. The Supreme Being he did not venture to call by any name, but indicated by a mysterious symbol, which represented the number 365 (in Greek numerals this was the letters *abraxas*). From the Supreme were created subordinate intelligences, of whom the angels, in 365 orders, were the lowest. Each of these orders made a separate heaven, and by the lowest, the chief of whom was the God of the Jews, the world was created. This chief wanted to subject all the nations to his 'chosen people,' but the other angels of the order leagued themselves against him, and the only result was strife, hatred of the Jews, and the loss of the true religion. To restore this, the Supreme sent the First of the Intelligences (Christ) to earth; but he only took the appearance of a man under the figure of Simon of Cyrene, who was crucified, while he returned to heaven. His followers maintained themselves till the 4th c., when they became extinct. Only fragments of his writings re-

main. See Miller's *Philosophumena* (Oxf. 1851), and Hoofstede de Groot, *Basilides* (Ger. transl. 1868).

Basilisk (*Basiliscus*), a genus of lizards belonging to the family *Iguanida*, and inhabiting tropical America. It wants the comb-like back ridge of the true iguanas, but is provided with a broad dorsal membrane, which is continued to form a broader fold on the tail, and is supported by the spines of the dorsal and caudal vertebrae. The 'dewlap' of the iguanas is also absent, and the pores on the inner surfaces of the thighs, seen in the iguanas, are also wanting. The top of the head is provided with a membranous sac, which can be dilated by the admission of air. In habits, the basilisks are adapted for swimming, and for an arboreal life. The teeth are attached to the inner surface of the jawbone. The common B. (*B. Americanus*) is a familiar species, and attains an average length of 2½ feet.



Basilisk.

Basilisk, from the Greek *basilikos*, diminutive of *basileus*, a king, was a fabulous creature of whom ancient and mediæval writers relate many wonders. It was found in the deserts of Africa. Pliny describes it as a serpent, and says that all other serpents fled at its approach; hence its name, rendered in the Vulgate *regulus*, while in the authorised version of the Old Testament the original *tsiphoni* is translated sometimes *adder* and sometimes *cockatrice*. Its breath scorched up all vegetation, and broke stones in pieces; at its touch the flesh fell from the bones of animals, and its glance destroyed life. Many species had marks on the head which were supposed to resemble a crown. If a man on horseback killed one of them with a spear, the poison would run up the weapon, and kill not only the rider, but the horse. In the middle ages it was generally represented as a lizard with eight feet. It is identified by many with the cockatrice, which was believed to be produced from an egg laid by an old cock, and hatched by a toad.

Basin, in geology, the depressed surfaces seen in rock strata, which may be produced by subterranean movements, by the solution and removal of underlying rocks, or by the action of glacier ice. Basins may be occupied by lakes, or may be filled up by formations of a more recent date—as in the London B., which is occupied by clays and sands.—B. is also a term used in geography to denote the entire region drained by a river and its tributaries, or the space between two watersheds. Thus the B. of the Ganges is the area between the Himalayas on the N. and the Vindhya range on the S. We also speak of the B. of a lake or sea. Thus the B. of the Mediterranean includes all the regions in Europe, Africa, and Asia, the waters of which flow into that sea.

Basingstoke, an old market-town of Hampshire, 27 miles N.E. of Southampton, and 46 W.S.W. of London by road, and 48 by railway. It stands at the junction of four railways, and of five important roads, is also connected with London by two canals, and has an active trade in corn, coal, malt, and timber. In 1645 Cromwell stormed and burned to the ground Basing House, the castle of the Marquis of Winchester, after a defence of over two years. Near B. is an ancient camp, in the form of an embankment 1100 yards in circuit. B. is the election-town for the N. division of the county. Pop. (1871) 5574.

Baskerville, John, well known for his services to typography, was born at Wolverly, Worcestershire, in 1706. In 1745 he engaged in japanning, into which art he introduced improvements that became to him a source of considerable wealth; later, he turned his inventive talents to printing, and succeeded, by cutting improved type, &c., in raising the art to higher perfection than it had ever attained in this country. His editions of a number of the classics, Bible, &c., are now very valuable as specimens of typography. B. was employed to print by the universities of Oxford and Cambridge. He died at Birmingham, January 8, 1775.

Basket, a kind of domestic utensil made of interwoven osiers or willows, rushes, twigs, grasses, or other flexible materials. The art of B.-making was probably one of the earliest arts

practised by man, and at all times in the world's history uncivilised nations have excelled in the art. Fragments of interwoven mats or other articles have been recovered from the prehistoric Swiss lake-dwellings; classical authors tell us that the B.-work of the ancient Britons was esteemed by the Romans; and natives of S. America at the present day construct vessels so closely woven as to hold water. The split-bamboo work of the Japanese displays great taste and elegance of design, and the minute wicker-work which occasionally encases their eggshell porcelain is unique. The most common materials for B.-making are osiers, which are extensively cultivated in the fenny districts, and along the river-banks of England. Those of the Thames and the Cam are most valued. B.-work is a coarse kind of weaving, in which the warp is represented by the stout osiers, designed as main-ribs for the structure, and the woof by the interwoven or wattled part. From the simplicity of the operations, the art is easily acquired, and is therefore well adapted as an employment for the industrious blind.

Basnage, the name of a French Protestant family, several members of which reached distinction in law, divinity, and general literature.—1. **Benjamin B.** (born 1580, died 1652), a theologian, whose treatise *De l'Eglise* (1612) was valued by his contemporaries.—2. **Henri B. du Franquesnay**, juriconsult, youngest son of Benjamin (born 1615, died 1695), was one of the most eloquent and able advocates in the Parliament of Normandy, and, like his brother, was held in great esteem both by Catholics and Protestants. Among his writings are *Costumes du Pays et Duché de Normandie* (1678, 1681, 1694), and *Traité des Hypothèques* (1687, 1724).—3. **Jacques B. de Beauval**, eldest son of the foregoing, and the most brilliant and accomplished of the family, was born at Rouen, 8th August 1653, studied theology at Saumur, Geneva, and Sedan, and was ordained to the ministry at his native town in 1676. In 1685, on the revocation of the Edict of Nantes, he left France and settled in Holland, first at Rotterdam, and afterwards at the Hague, where he became minister of the Walloon Church. He also took an active part in state affairs, and gave himself to the cultivation of literature. He was largely instrumental in promoting the alliance between England, France, and the States-General in 1717. He died 22d December 1723. Of his numerous writings, we can only mention *La Communion Sainte* (Rotterd. 1688), admired by Catholics as well as by Protestants; *Histoire de l'Eglise* (Rotterd. 1699); *Histoire des Juifs* (Rotterd. 1706); *Dissertation historique sur les Duels et les Ordres de Chevalerie* (Amsterd. 1720), a work full of curious erudition.—4. **Henri B. de Beauval**, brother of Jacques, born at Rouen, 7th August 1656, was practising as an advocate there when the revocation of the Edict of Nantes forced him also to seek an asylum in Holland, where he died, 19th March 1710. He is the author of *Tolerance des Religions* (1684), *Histoire des Ouvrages des Savants* (1687), and *Dictionnaire Universel* (1701).—5. **Samuel B. de Flottemanville**, grandson of Benjamin (born 1638, died at Zutphen, 1721), wrote, among other works, *Annales politico-ecclesiasticæ Annorum 645 a Cesare Augusto usque ad Phocam* (Rotterd. 1706), and *De Eibus sacris et ecclesiasticis Exercitationes historico-critice*.

Basoches (a corruption of *Basilica*, the palace of the king), a corporation of law-clerks connected with the procureurs who attended the Parliament of Paris after it had ceased to be the King's Council. Created by Philip the Fair about 1303, the B. had many privileges: a king, wearing a cap like that of the French king, a blue and yellow standard, many officers, a legal jurisdiction in disputes of members, a right to issue currency, the curious right of 'plantation d'arbre,' &c. Every July they held a grand review, followed by a dramatic representation. This last was a species of morality, farce, or *sofie*, half-way between the *Religious Mysteries* (played by the Brotherhood of the Passion), and the *Fests of Fools*, and the modern drama. The B. began with abstract moralities, in which the characters had names, such as *Honte-de-dire-ses-Péchés*, *Espérance-de-longue-vie*, &c. They soon introduced allusions to passing events, and being found politically troublesome in the early disputes of the 15th c., these farces or satires were suppressed till the reign of Louis XII., who licensed their performance in the grand saloon of the Palais. They were again suppressed in 1540, but it is said the B. received about the same time a royal grant of the *Préaux-clerics*. *L'avocat Patelin*, although sometimes described as

a *sofie* of the *Enfants sans Souci*, was probably a favourite farce of the B. The B. undoubtedly represent an original and fertile tendency of the French mind, which did not get fair play under the Renaissance.

Basque Provinces (Span. *Las Provincias Vascongadas*; Basque, *Euscaleria*), the name generally given to the united provinces of Alva, Biscay, and Guipuzcoa, in Spain, situated at the S.W. corner of the Pyrenees, and stretching W. along the Bay of Biscay. Total area, some 3000 sq. miles; pop. (1870) 471,989. The country is generally mountainous, but is intersected by many small rivers, and has numerous well-cultivated plains and valleys. It presents a highly picturesque mingling of the pastoral and the highland, a look of verdurous wealth being given to the landscape by the oak, beech, and chestnut forests which clothe the elevated slopes. Agriculture is still in a primitive state, and the soil is not rich. All the farms are small—the proprietor, his wife, and family being frequently the only labourers. Among the products are wheat, barley, maize, flax, hemp, fruit, and a miserable wine called 'chacoli' (Arab. *chacale*, weakness), of which the Basques alone are fond. Corn only ripens in the more favourable regions. The hills are rich in iron, copper, and tin, and also in marble, porphyry, and jasper. Besides farming, the chief occupations are commerce, fishing, iron-working of a rude kind, and smuggling. The Basques, or *Euscaldunacs*, as they call themselves, make bad regular soldiers, but are celebrated for their obstinate valour in guerilla warfare. They form the backbone of the Carlist party, and it is amidst their rugged fastnesses that the civil war which has long distracted Spain still (1875) lingers on. Long independent, they voluntarily submitted to the kings of Castile in the 13th c., but reserved many rights (*fueros*), privileges, and immunities, which they retain to the present day; as exemption from the salt and tobacco monopolies, from conscription, &c.

The B. P. represent the *Cantabria* of the ancients, and, like our Wales, form a corner of the land from which no power has been able to dislodge the aboriginal inhabitants, who still preserve the marks of a distinct nationality in their government, language, manners, and costume. Their origin is still a disputed question, but scholars generally favour the opinion that they are the descendants of the old *Iberis*, who occupied the whole of the peninsula before the immigration of the Celts, and that they belong to a stock or family of nations who peopled Europe before the advent of the Aryan races. (See ARYAN.) Their language (*Euscara* or *Figuera*) shows no trace of connection with any Aryan tongue, and is probably Turanian. Four dialects are in use, but their literature is unimportant, consisting chiefly of proverbs, songs, and popular plays on political and historical subjects. See the *Grammars of the Basque Language* by Blain (1854) and Lardizabal (1856), the *Lexikon* by Chaho (1856), Humboldt's *Untersuchungen über die Urbewohner Hispaniens* (1821), Mahn's *Denkmäler der Bask Sprache* (1857), and the works of Michel (1857), Bladé (1869), and Garat (1869).

Bas-Relief (Ital. *basso-rilievo*, low relief). Figures which project only in a slight degree from the ground on which they are sculptured receive this appellation, in contradistinction to those of middle and high relief. See ALTO-RILIEVO.

Bass, or **Base**, in music, is, whether played or sung, the lowest 'part'—the one which forms the foundation of the harmony. Among stringed instruments the B. part is taken by the violoncelli and double basses; among reeds, by the bassoons and contra-bassoons; among brass instruments, by the ophicleide, bass trombone, bombardon, &c. Among voices, that which sings the B. part is called the B.: it is the lowest male voice, and its compass is in

ordinary cases  all these notes being chest notes.

Bassa's, Great, a port of the Liberian Republic, Upper Guinea, Africa, with a considerable export trade in pepper, coffee, cotton, and cocoa. The vicinity is rich in tropical fruits, such as lemons, bananas, and oranges. Pop. about 5000.—**Little B.**, 20 miles N.W., is a maritime village of some size.

Bassano, a town in the province of Vicenza, N. Italy, on the Brenta, 40 miles N.W. of Venice, with large silk and straw-hat manufactures, and a trade in wine, olives, and leather. It was

the scene of a victory of Bonaparte over the Austrians, under Wurmser, September 8, 1796; and near it other battles took place, 6th November 1796, 11th November 1801, 5th November 1805, and 31st October 1813. The French statesman Maret was made Duc de Bassano in 1811. Pop. 12,207.

Bassano, Giacomo da Ponte, an Italian painter, born at Bassano, 1510, pursued his art in Venice, inspired by the masterpieces of Titian, Parmegiano, and Tintoretto; retired to Bassano on the death of his father, and died there in 1592. His *Samson Destroying the Philistines* is, in parts, said to be not unworthy of Michael Angelo; and his *Nativity* and *Flight into Egypt*, in the style of Titian, compare not unfavourably with that master. After retiring from Venice, B. took to painting landscape, with animals and figures, and achieved great success in that department of art. He also painted many portraits of famous contemporaries—among them Tasso and Ariosto. His two eldest sons, Francesco (born 1541, died 1591), and Leandro (born 1560, died 1623), were also original artists of merit; the two younger, Giambattista (died 1613) and Girolamo (died 1622), were chiefly noted for their skill as copyists.

Basse, or **Sea-Dace** (*Labrax*), a genus of Teleostean fishes included in the Perch family (*Percide*). The genus is represented by the B. or sea-perch (*L. lupus*), which is found chiefly on the southern coasts of Britain and in the Mediterranean. Allied species—such as the striped B. of the United States (*L. lineatus*)—occur in American waters, and also in the Mediterranean Sea. The body of the common B. is elongated and perch-like, and measures usually from 12 to 18 inches in length; but may greatly exceed these dimensions, and may weigh 15 or 16 lbs. There are two dorsal fins. Teeth are borne upon the jaws, vomer, palate, and tongue. The gill-cover terminates in two spines. This fish is valued as an article of food. The stone B. (*Polyprion cernium*) occurs in the S. Atlantic, in the Mediterranean Sea, and on the coasts of America, but is rare on the British coasts. The dorsal fin is single, its front half being spinous. This latter species feeds upon barnacles and other crustacea.

Bassein, the chief town of the district of the same name, province of Pegu, British Burmah, on the left bank of the river B., 75 miles from its mouth, with a pop. (1876) 42,417. Identified with the *Beynaga* of the geographer Ptolemy, it was an important place under a succession of native rulers. On the right bank of the river are the shipping warehouses and steam mills for husking rice. The neighbouring plain is strewed with ruins of pagodas, monasteries, and colossal images of Buddha. In 1876-77 the exports were valued at £503,000; the imports at £44,000. The B. district has an area of 6517 sq. miles; pop. (1876) 302,858. Rice is the principal product of the district, which comprises most of the lower delta of the Irrawaddy. Another B., in the presidency of Bombay, 28 miles N. of Bombay, and 5 miles from the station of the same name on the Bombay and Baroda Railway, was once an important city and fortress. A treaty was signed at B., December 31, 1802, by which the *Peishwa*, the head of the Mahratta power, received an English force into his dominions, and prepared the way for his subsequent overthrow. Pop. (1872) 4063.

Basses, two groups of rocky islets, known as the **Great** and the **Little B.**, S.E. of Ceylon; the former in lat. 6° 8' N., long. 81° 30' E.; and the latter in lat. 6° 20' N., long. 80° 59' E., with a large granite lighthouse, erected in 1875.

Basse-Terre (Fr. 'lowland'), the capital of the English island of St Kitt's in the W. Indies, was founded in 1623, and has a good trade. The district was named B.-T. by the French, from its being the lower portion of the island, the portion occupied by the French till 1713. Pop. of town 7000.—**B.-T.** is also the name of the capital of Guadeloupe, on the S.E. coast of the island. It is a handsome town, with a pop. of 15,000.

Basset Horn (*corno di bassetto*), an old reed instrument very similar to the clarinet in quality and compass.

Bassia, a genus of tropical trees of the order *Sapotacea*. They have pulpy fruits, which enclose three or four seeds containing a fatty oil. The shea butter-tree mentioned by Mungo Park has been referred, as *B. Parkii*, by some authors to this

genus. The Indian butter-tree (*B. butyracea*) yields a useful lardaceous oil, which keeps sweet for a great length of time. Some species are important timber-trees, and others yield, in addition to their valuable oil, alcohol and medicinal products.

Bassompierre, François de, a French marshal, diplomatist, and author, was born at the château of Harouel, in Lorraine, 12th April 1579. A favourite at the court of Henry IV., he was appointed by the queen-mother (Marie de Médicis) Col.-Gen. of the Swiss Guards, and fought bravely in the early Huguenot wars of Louis XIII. Luynes sent him on embassies to Spain and Switzerland; and Richelieu sent him to England to adjust the dispute about the dismissal of Queen Henrietta's household. B., who had become a marshal of France in 1622, was present at the siege of Rochelle; but in consequence of his attachment to the Guises, Richelieu, in 1631, threw him into the Bastille, where he remained for twelve years writing his *Mémoires* (Cologne, 2 vols. 1665; Amst. 4 vols. 1723), which are valuable pieces of history for the period, 1598-1631. B. died 12th October 1646. He also wrote an account of his embassies (Cologne, 1661). His *Notes*, written in prison on a copy of the *Lives* of Henry IV. and Louis XIII., are bold and bitter. They were published at Paris in 1665. See M. de Puymaigre's *Vie de B.* (1848). B. was brave and witty, but also licentious, and a fop.

Bassoon (Ital. *fagotto*), is a reed instrument, the bass instrument of the Oboe (q. v.) family. It is made of wood, and furnished with holes and keys in the usual way. A small S-shaped brass tube is fitted to its narrowest end, and to the end of this a wooden reed is fixed, which is held in the performer's mouth. The compass of the B. is about three octaves down from middle-line B \flat . Its natural key, as commonly used, is B \flat , but several varieties of the instrument are in existence, chiefly used in military bands.

Bassora, or **Bas'ra**, now **Bussorah** (Semitic, 'fortress'), also in old writers, **Balsorah**, a town and river-port in the vilayet of Bagdad, Asiatic Turkey, on the W. bank of the Shat-el-Arab, formed by the junction of the Tigris and the Euphrates, and about 70 miles from the Persian Gulf. It is a filthy and unhealthy town, and most of the houses are built of sun-dried clay, in some instances faced with burnt bricks. In the middle of the 18th c. B. had a pop. of 150,000, which in 1824 had fallen to 60,000 after the pestilence and inundations of 1831, to 20,000 after the pestilence of 1838, to 12,000; and (according to Schlegel's 1862 est.) under 5000, chiefly Arabs and Persians. The neighbourhood is naturally one of the most fertile regions in the world, and with a little cultivation would yield abundance of the most various fruits; but the misrule of the Turk is ruinous to the land, and the date-palm is almost the only product of the region which is exported. 'The date-groves' (Consular Report, 1874) 'are of great extent and value; they form an almost unbroken line, from 1 to 3 miles in depth, along both banks of the Euphrates and Shat-el-Arab, from Medinah to the sea (i.e., for more than 140 miles).' In 1873 the yield amounted to 35,754 tons. The fruit is sent to the ports of the Indian seas, and thence transhipped to Europe. There is also a considerable trade with India in horses, and caravans ply between B. and the interior of Asiatic Turkey. At the time of the date-harvest, when all sorts of craft from the coasts of Arabia and Persia come to B., there is a short stir of life about the town. In 1862 the English Tigris and Euphrates Steam Navigation Company put on a steamer to run regularly between B. and Bombay, and in 1864 a telegraph wire connected B. with Kurachi in India. According to the Consular Reports of 1874, the British and British-Indian shipping entered at the B. custom-house (for 1873) was 118 ships of 35,208 tons. The chief imports are coals and piece-goods from England, tobacco from Persia, and coffee, sugar, pepper, and wood from India.

B. was founded in 636 by the Calif Omar to cut off the Persians from the sea, and to obtain the command of the Euphrates and Tigris, and rose into great importance as the emporium of Indian and Arabic wares for the califate of Bagdad, and as a seat of early Moslem poetry and scholarship. In the 10th c. Ibn-Risaa instituted here one of the first learned academies of the middle ages, and in the 12th c. it contained 7000 mosques. Next to Bagdad it plays the most important part in the *Arabian Nights' Entertainments*. In 1638 it fell into the hands of the Turks, and though it has frequently changed masters since, it has finally remained in their possession. A great wall, 94 miles

in length, has been built on the side nearest the desert, to guard the town against the incursions of Arab robbers.

Bass'o-Billie'vo. See **BAS-RELIEF**.

Bass Rock, a singular islet, some 2 miles off the Haddingtonshire coast, near the entrance to the Firth of Forth. It is precipitous and nearly circular, being about a mile in circumference, and 350 feet high on the N.E. side, shelving down to the water on the S.W., where alone it is accessible, and where it was fortified at some uncertain date. The rock is of fine granular greenstone, is traversed from N.W. to S.E. by an immense cavern, visible at low tide, and is the resort of vast numbers of aquatic birds, including annually, it is estimated, some 15,000 solan geese. The Bass now belongs to the descendants of Sir Hew Dalrymple, and is rented by a keeper, so called. According to vague tradition, it was tenanted by St Baldred in the 7th c.; but the first authentic incident in its history seems to be that it was the refuge of the son of Robert III., afterwards James I. of Scotland, prior to his English captivity of nineteen years. It was visited by James VI. in 1581, on which occasion 'Lauder of the Bass' stoutly refused to give up his property to the state. In 1651 the Church of Scotland Registers were deposited here in dread of Cromwell, to whom, however, they were surrendered in the following year. Charles II. acquired the Bass for £4000 in 1671, and it was subsequently used as a prison during the persecution of the Covenanters. It was afterwards seized by a chivalrous band of twenty-four Jacobites, who defended it with courage and pertinacity (1691-94) as the last stronghold in Britain of the Stuart cause. Its fortifications were razed by order of William III. in 1701. See *B. R.*, &c., by Hugh Miller, Dr Thomas M'Crie, Rev. James Anderson, and Professors Balfour and Fleming (Edinb. 1848).

Bass Strait separates Tasmania from Australia. It runs E. and W., and is about 200 miles wide. Its centre may be said to be at the intersection of the parallel of 40° S. and meridian of 146° E. It contains many islands, the chief being King, Flinders, Cape Barren, and Clarke islands. The strait bears the name of its discoverer, Mr Bass, surgeon of H.M.S. *Reliance*. After an unsuccessful attempt to reach it in a whaleboat from Sydney, Bass obtained a sloop of 25 tons from Governor King of New South Wales, and in this vessel he not only discovered the strait (1798), but circumnavigated Tasmania. He was accompanied in this voyage by Flinders, but to Bass himself the credit of discovering the strait entirely belongs. Bass Strait is now an important ocean thoroughfare.

Bast, the fibrous inner bark or liber of plants. Although, strictly speaking, many of the most important fibres of commerce, such as flax and jute, are the products of B. or liber, the term is generally restricted to a few substances which retain much of their original bark structure in their industrial employment. *Russian B.*, which is very largely employed by gardeners and for packing furniture, &c., is prepared from the bark of the lime-tree (*Tilia Europæa*), the B. being torn into strips and very coarsely woven. The 'tapa' cloth of the South Sea Islands is the B. of a tree (*Broussonetia papyrifera*), and this forms the chief paper-making material of the Chinese and Japanese. From the B. of the sabb-tree (*Antraris saccidora*) the Hindoos and Singalese prepare useful bags by beating the bark till it is loosened from a portion of the stem, which is then cut out, and a plug of wood attached to the bark is left at the lower extremity to form the bottom. In the W. Indies children's caps and small articles of dress are made from the inner bark of *Lagetta lintearia*, the fibres of which interlace so closely that the material has a very lace-like aspect. In Brazil the papery inner bark of the huge monkey-pot tree (*Lecythis ollaria*) is used for wrapping up cigarettes; and under the name of Cuba B., the same part of *Paritium elatum* is employed for tying up cigars. So-called B. brushes are made from the fibre of the leaf-stalk of the Piacaba palm (*Attalea excelsa*).

Bastard and Bastardy. By the law of England a child is a B. who is not born in wedlock or within natural time after its determination. But if the child be begotten while the parents are single, and they marry before its birth, the child is legitimate. Again, though the usual course of gestation is nine months, the law is not strict on this point. See **PREGNANCY**; **GESTATION**, **LAW REGARDING**.

The legitimacy or illegitimacy of the child of a married woman living in adultery is a question of evidence for a jury to determine. Legitimacy is generally presumed unless it be shown to be physically impossible that the husband of the woman can be the father of the child. But *access* of the husband is not conclusive of legitimacy; and in the Banbury case, though access was clearly proved, the House of Lords decided that concealment of birth of the child by the mother from her husband was enough to prove an adulterous issue. See **FILIATION**.

A B. has no rights but what he acquires; being in the eye of the law the son of nobody, he cannot be heir to any one, nor have heirs but of his own body. The law of England is especially harsh as regards bastards. Not only does it not allow a child born out of wedlock to be made legitimate by the subsequent marriage of its parents, but it has even been decided that when a child is so born in a foreign country, and so made legitimate according to the law of that country, it is still illegitimate in England, and subject to all the disabilities of illegitimacy. A B. may make an effective will, but if he die intestate, his succession falls to the crown. It is usual, however, for the crown to transfer its right to the nearest relative or relatives of the deceased B. In Scotland the law allows the legitimation of a B. by the marriage of its parents at any time. In both countries the widow of a B. is entitled to the same legal rights as if her husband had been legitimate. See **LEGITIMATION**.

Bastard Eigné, in English law, is an eldest son, illegitimate, whose father and mother have been married subsequent to his birth, and have had other children.

Bastardy, Declarator of, in the law of Scotland, is the legal procedure by which the crown's *donatory* or *donee* asks to have it declared that the lands or effects of a deceased bastard belong to him, in virtue of a gift from the crown. The defender called in the action is the person who, had the bastard been a lawful child, would have succeeded to him. A D. of B. seems also to be competent during the life of a bastard to any one who has a good title and interest to prove the bastardy. (See under **ACTION**, *Action of Declarator*.) In England, the same objects may now be effected under the *Legitimacy Declaration Act*, 1858.

Bastardy, Gift of. In Scotland the G. of B. conveys power to institute a *Declarator of Bastardy* (q. v.), which is necessary to entitle the *donee* to the crown to the gift.

Bastia, a fortress and seaport in the N.E. of Corsica, once the capital of the island, and still more important than the present capital, Ajaccio. A singular rock, resembling a lion couchant, and called by the natives 'Il Leone,' lies at the mouth of the harbour, which is defended by a mole. The chief Corsican courts sit at B. There are manufactures of leather and soap, and wine, oil, and figs are exported. B. has regular steamboat communication with Ajaccio and Marseille. The town was founded by the Genoese Lomellino in 1380. The language spoken is Italian, but French is generally understood, Corsica having come into the possession of the French in 1768. Pop. about 20,000.

Bastiat, Frédéric, one of the most brilliant, if not most profound, of political economists, was born at Bayonne, 29th June 1801. He became, like his father and uncles, a merchant, and in his leisure hours studied political economy. An article of his on English and French tariffs, in the *Journal des Économistes*, showed him to be opposed to protection in trade. He subsequently became the friend and ally of Cobden and the English free-traders, whose speeches he translated into French. At the same time he opposed Prudhon and the Socialists. He died of pulmonary disease at Rome, 24th December 1850. B.'s works, one of which, the *Harmonies Économiques*, has been translated into English (Lonā. Murray, 1860) by D. P. J. Stirling, are written in an epigrammatic and sarcastic style, and are eminently readable. The best-known besides the one mentioned are *Sophismes Économiques* (1846); *Propriété et Loi, Justice et Fraternité* (1848); *Protectionisme et Communisme* (1849); *Paix et Liberté, ou le Budget Republicain* (1849). The second edition of his *Œuvres Complètes*, in 7 vols., appeared in 1865.

Bastide, Jules, a French publicist, was born at Paris, November 22, 1800. He was one of the first members of the

French Carbonari, and fought gallantly in the revolution of July 1830, after which he became conspicuous as a writer against the Orleans dynasty. In 1832 he obtained the command of a legion of artillery, took part in the insurrection of June 5th, for which he was condemned to death, but managed to escape to London, whence he returned pardoned in eighteen months. He afterwards established the *National* and the *Revue Nationale*, special organs of republicanism, and at the revolution of 1848, held the office of Foreign Minister from May to December of that year. He contributed to M. Buchez's *L'Histoire parlementaire de la Révolution Française* (5 vols. 1845-47), and has published *L'Éducation publique en France* (1847), *L'Histoire de l'Assemblée Législative* (1st vol. 1847), *La République Française et l'Italie en 1848* (Brus. 1858), *Guerres de Religion en France* (2 vols. 1859, 3d ed. 1868). He has been one of the editors of the *Revue de Paris*.

Bastille, also **Bastide** (Old Fr. *bastir*, to build). In the 13th, 14th, and 15th centuries this word was used to denote a camp surrounded by an enclosure of some kind, which gave it the character of a fortified work, having some resemblance to a redoubt. The name was also given to any strong castle constructed in masonry, and has acquired historical celebrity in connection with the work built during the reigns of Charles V. and VI. for the defence of Paris. Before their time the approach to the city, on the site now occupied by the Faubourg Saint-Antoine, was defended only by two isolated towers. Hugues Aubriot, provost of the merchants, conceived the idea of erecting a fortress at this point. The works, begun in 1369, were finished in 1383, but additions were made at a later period. During the civil wars in France, the contending parties often strove for the possession of a stronghold that commanded the capital. From the first the B. was used as a state-prison. It is even said that Aubriot himself was its first inmate. In its later form it had eight towers of five stories each, the rooms in which had no fireplaces. Larger apartments with fireplaces were constructed in the walls connecting the towers, and were assigned to prisoners of importance. The prisoners were first conducted to the governor, to whom the police delivered the *lettre de cachet* authorising their imprisonment. There was accommodation for about eighty prisoners. The capture of the B. by the Parisian mob, 14th July, was the beginning of the French Revolution. Even the courtiers of the king recognised this. When the news was brought to Louis, he said, 'Mais c'est une revolt.' 'Sire,' answered the Duke of Liancourt, 'c'est une revolution.' Its demolition was decreed on the 16th, and with the materials the bridge of Louis XVI. was constructed. Not a vestige of the B. exists, but its site is marked by a column in the Place de la B. It has, however, occasioned a good deal of more or less interesting literature. See Linguet's *Mémoires sur la B.* (Lond. 1873); *Remarques historiques et anecdotes sur le Château de la B.* (Par. 1789); *La B. dévoilée* (Par. 1789); Bojanowski's *Erstauung der B.* (1865); and Ravaisson's *Archives de la B.* (7 vols. 1866-75).

Bastina'do (from the Sp. *bastonado*, the same as the *bastonnade*, from *baston*, now *bâton*, a cudgel or stick), a Turkish and Chinese mode of punishment, in which the culprit is beaten on the soles of the feet with a baton or cudgel.

Bastion (Old Fr. *bastir*, to build), in fortification, is a part of the main enclosure or defensive works of a fortified town or other position to be defended. It is a species of low, broad tower, and the rampart by which it is formed is disposed on four sides of a pentagon, two of which, technically called the *faces*, are the outermost, and meet in an angle, while the other two, termed the *flanks*, connect the opposite extremities of the faces with the *curtain*, which is that plain-wall portion of the rampart, usually a polygon, which is run round the fortified place. The fifth side of the pentagonal B. is generally unoccupied by the rampart, opens towards the interior, and is called the *gorge*. The B. is mainly a mound of earth, capable of supporting heavy ordnance, and resisting the fire of the assailant; but it is faced and strengthened, where the military engineer thinks needful, with stone or brick. When the interior of a B. is filled to the top with earth, rubble, or other materials, it is technically called *solid*: it is a *hollow B.* when its floor is level with the town. The detached B., or *lanette*, was devised by Vauban to enable the besieged to hold out after the main bastions were taken.

Basuto Land. See KAFFRARIA.

Bat, the name given to the members of the Mammalian order *Cheiroptera* ('hand-winged'), the distinguishing characters

of which group consist in the elongation of the fore-limbs, and in the development of the digits of those limbs, which, with the exception of the thumb, are remarkably long, and serve to support a *patagium*, or flying-membrane. This membrane, besides stretching between the greatly elongated fingers, extends also along the



Bat.

sides of the body, between the fore and hind limbs, and in many instances between the hind-limbs and tail. The other characters which distinguish the *Cheiroptera* are included in the possession of one or two pairs of mammary glands borne on the breast. The third, fourth, and fifth fingers are destitute of nails, the second digit generally wanting a nail also. The thumbs are always provided with hooked, claw-like nails, by means of which these creatures suspend themselves from the walls of their habitations. The bats are most active in flight, the *patagium* serving as wing-like organs, aided by the extension of the fore-limbs. They progress awkwardly on the ground. When on the ground, the thigh-bones, from their position, are twisted backwards and upwards, the knee having the same position, and the toes being disposed outwards and slightly backwards; the fingers are also bent upon the palms of the hands, the wing-membrane being folded upon the sides of the body, the thumbs alone being extended. As thus placed on the ground, the bats move with a shuffling, interrupted gait, by pushing themselves from behind with the hind-limbs, and pulling themselves forward with the thumb-claws. Besides suspending themselves by the thumbs, the bats also attach themselves by the claws or nails of the feet, and thus hang head-downwards, with the wing-membrane folded over the front portion of the body. The hind-feet usually possess five toes, which are all of proportional length, and are provided with strong hooked nails. The *patagium* is generally destitute of hairs on both sides, and is of leathery consistence. The body itself is covered by a light, delicate fur. In the structure and disposition of the skeleton, the bats do not present many further peculiarities than those included in the elongation of the fingers. The neck vertebrae are large in proportion to the other spinal segments. The ribs are also large, and the chest is capacious. The breast-bone possesses a keel-like crest or ridge, to which the muscles moving the wing-like fore-limbs are attached. The collar-bones are strong. The *ulna* is most frequently of rudimentary description, the *radius* forming the chief bone of the fore-arm. The pelvic-bones are long and narrow, and are not united in front at the pubis—a disposition of parts also seen in *Insectivora*. The *fibula*, or smaller bone of the leg, like the *ulna* of the fore-arm, is rudimentary. A special bone, known as the *calcar*, exists to the inner side of the ankle-joint, and supports the wing-membrane. None of the bones are filled with air as in birds. Three kinds of teeth—incisors, canines, and molars—are present. In those bats that eat fruit, the molars are tuberculate; whilst they are provided with sharp-pointed cusps or processes in the insectivorous forms. The stomach is most complex, and the intestine largest in the fruit-eaters. No caecum exists. The brain-surface is smooth, and destitute of convolutions, and the cerebellum, or lesser brain, is uncovered by the lobes of the cerebrum, or true brain. The senses of the bats are present in tolerable perfection. The eyes are small. The ears are generally large, and these, together with the nose, may be provided with folds of skin, of service in increasing the intensity of sound, and in intensifying the sense of smell. The sense of touch is present to a high degree in the *patagium*. In habits, most of the bats are nocturnal, and sleep by day suspended in the crevices of buildings, in caves, or in the recesses of trees. During winter they hibernate. The food varies, some forms subsisting on insects, others on fruits, whilst some (e.g., vampire bats) have attained a notoriety from

their habit of sucking the blood of other vertebrate animals. The testes of the males are abdominal, but descend into the perineum at the breeding season. The uterus of the female may be horned, or present a rounded extremity. As an order of Mammals, the bats present near affinities to the *Insectivora* (e.g., moles, shrews, &c.), and by most naturalists are regarded as insectivorous forms modified for an aerial life.

The *Cheiroptera* are divided into two sections. The *Frugivora*, or fruit-eaters, represent the first of these. These forms are distinguished by the number of incisor teeth, which do not exceed four in each jaw. The nose and ears possess no foliaceous or leaf-like appendages. The hinder part of the stomach is greatly elongated. With a single exception (*Hypodermis*), all the *Frugivorous* bats possess nails on the second finger of the hand. The crowns of the molar teeth are marked by a longitudinal groove. These bats, sometimes termed 'fox bats' from the fox or dog-like shape of the head, possess elongated muzzles. The tail is short or wanting. Incisor and canine teeth exist in both jaws, and the molars are tuberculate. The *Pteropida*, or fox bats of the Eastern Archipelago, of which the Kalong B. (*Pteropus adullis*) may be cited as an example, represent this group. This family includes several other genera—such as *Hypodermis*, *Harpia*, &c. These bats do not refuse to eat birds, or even mammals of small size. They are chiefly inhabitants of Java, Borneo, Australia, and Africa. They are not found in the New World.

The second group of bats is the *Insectivora*, or insect-eating forms, whilst some suck the blood of mammalia. The second finger of the hand is nailless in these forms. The molar teeth are provided with cusps, and number more than six or less than four on each side of each jaw. The incisors may number four on each jaw, or four above and six below, but are occasionally present in less number. The nose and ears are usually provided with curious leaf-like appendages, giving to these bats a most singular appearance. The tail is long, and may be prehensile. The *Vespertilionida* form the first family, and are represented among many others by the little Pipistrelle (*V. pipistrellus*), which forms the common British species; by the Long-eared bat (*Plecotus auritus*), distinguished by the length of the ears, which meet above the forehead; and by the Noctule (*V. noctula*), which measures 6 inches in length, and about 15 in expanse of wing. In this family the nose has no leaf-like appendages. The *Rhinolophida*, or horse-shoe bats, possess leaf-like nasal appendages. In other respects they resemble the members of the previous family. The greater and lesser horse-shoe bats of Britain (*Rhinolophus ferrum-equinum* and *R. hipposideros*) are examples of this group. Their popular name is derived from the form of the nasal appendages. The *Phyllostomida* or Vampires form the last family of the order. The ears in these latter bats are small, and the nose has foliaceous appendages. The canine teeth are large, and four incisors exist in each jaw. The vampires are found only in tropical America. The typical vampire (*Phyllostoma spectrum*) measures about 2½ feet in expanse of wing. These forms suck the blood of birds and larger mammals—such as horses, cows, &c.—although it appears they attack man only under exceptional circumstances. Darwin mentions the fact of a horse having been bitten, the bite leaving no bad effects save a little inflammation, which soon disappeared.

The bats are first represented as fossil organisms in the Upper Eocene rocks by the *Vespertilio Parisiensis* of the Gypseous series of Montmartre, in France. In Miocene, Pliocene, and Pleistocene rocks, other species of this genus occur. The *Rhinolophida* are found in cave-deposits, and the vampires occur in similar deposits in Brazil.

Batan'gas, the capital of a province of the same name, stands on the W. coast of Luzon, the largest of the Philippines, 50 miles S. of Manila. It was founded in 1581, and carries on considerable trade. Pop. of town and province, 17,000.

Batar'deau (diminutive of Old Fr. *bastard*, a dyke; perhaps from *bastie*, to build), a strong wall built across the ditch of a fortification, with a sluice-gate to regulate the height of the water on both sides of the wall.

Bata'tas, a genus of Dicotyledonous belonging to the natural order *Convolvulaceae*, embracing about twenty species. *B. adullis* yields the sweet potato. The plant has handsome purple

flowers, resembling those of a *convolvulus*, and large edible roots, which are largely used as food in tropical countries. It is cultivated throughout the globe wherever the climate is suitable, extending from S. America to the warmer parts of the United States in the New World, and from the Malayan Archipelago to Japan in the Old. It is also grown in Spain.

Bat'avi, or **Bata'vi** (also **Vatavi**), a people first mentioned by Cæsar, were an offshoot of the Chatti, a German nation, who left their home, and, along with the Canninefates, occupied an island in the Rhine. This island—*Insula Batavorum*—was formed by the N. branch of the Rhine, by the Waal, and thereafter the Maas, and by the sea. The B. were good horse-men, and served as cavalry in the Roman army. In A.D. 69 they rose in rebellion under Claudius Civilis, but were completely subdued. They remained, however, exempt from taxation, and enjoyed the title of brothers and friends of the Roman people. After the 3d c. they disappear among the Salian Franks.

The *Batavian Republic* was the name applied to the Netherlands after the change of their constitution by the French, 16th May 1795, and retained till 5th June 1806, when Louis Bonaparte was declared King of Holland.

Bata'via, the capital of the Dutch possessions in the E. Indies, situated on the N.W. coast of Java, at the mouth of the Tjiliwong, is the chief emporium of the Eastern Archipelago. Its proverbial unhealthiness has been considerably modified by draining the marshes, by a better arrangement of the streets, and other sanitary improvements. The town is intersected by canals, and the harbour affords anchorage for large ships. The Dutch established a factory here in 1612, but when Holland became subject to France, B. fell into the hands of the French. It was taken from them in 1811 by the English, who restored it to the Dutch in 1816. A telegraphic cable has been laid between B. and Singapore, which threatens to divide with it the trade of the East. A railway from B. to Buitenzorg has been worked since 31st January 1873. Pop. (1872) 65,000.—The province of B., in the N.W. end of the island, is in general flat, and owing to the scarcity of water, not quite so fertile as other districts of Java; but it produces rice, coffee, sugar, tobacco, rattans, tea, pepper, fruits, and vegetables. The forests in which it once abounded have been cut down for the use of the sugar-factories. The Chinese element is rapidly increasing, and the principal industries are now mostly in their hands. There are sugar-works and distilleries, tin, copper, and dye works. The religion of the natives is Mohammedan, and the language is a mixed tongue, known as the Low Ma.ay. Pop. (1872) 401,563, of whom 4145 are Europeans, 41,137 Chinese, 943 foreign orientals, and the rest natives.

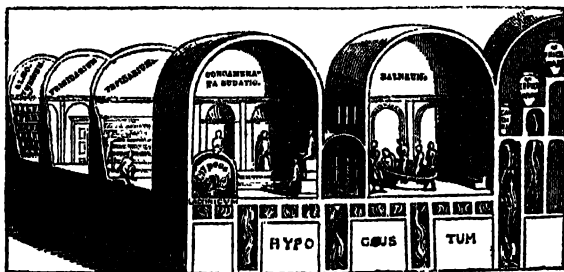
Batawa' Palm. See **CENOCARPUS**.

Bat'enburg, a small town in the province of Gelderland, Netherlands, on the Maas, 26 miles S.E. of Utrecht, chiefly notable as the *Oppidum Batavorum* of the Romans.

Bath, the largest city in Somersetshire, lies on the Avon, in the N.E. of the county, 10 miles S.E. of Bristol, and 106 W. of London by railway. It was long the gayest watering-place in the kingdom, and is still one of the most beautiful cities of Europe, nestling in a well-wooded valley, and built of fine white freestone or oolite obtained from quarries in the vicinity. Its principal buildings are the Abbey Church, with a tower 150 feet high; St James's and St Michael's Churches; an assembly, theatre, and concert-rooms; a museum, guildhall, club-house, and the establishments connected with its baths. There are also two public parks, a philosophical institution, a mechanics' institute, a subscription library, and many high-class schools. New waterworks were introduced (1876) at a cost of £100,000. B. owes its importance to its hot chalybeate springs, of which there are four, having a temperature of from 97° to 117° F., and discharging 184,320 gallons daily. The complaints chiefly benefited by the waters are palsy, rheumatism, gout, scrofula, and diseases of the nerves, bile, and skin. From the middle of the 18th c. to the time of the Regency of George IV. was perhaps the most brilliant period in the history of B., and it still continues to be a resort of the fashionable. It sends two members to Parliament. Pop. (1871) 53,704, greatly increased occasionally by visitors. The springs of B. were known as early as the 1st c. to the Romans, who had here a station called *Aqua Solis*, or *Aque Calide* or *Sudata*. The present name was given to it

by the English conquerors, to whom it was known as *Lar Bathan*, also *Acomannes Caester* ('city of the sick man'). The first extant charter of the town dates from the reign of Richard I. In 1092 the see of the Bishop of Wells was transferred to B., and since 1135 the bishopric has been styled after both places. Many valuable Roman remains have been found, including extensive remains of baths.

Bath. The practice of bathing has existed from the earliest times. It seems to have had a moral significance, a connection being generally recognised between 'the bodies washed with pure water,' and 'the hearts sprinkled from an evil conscience.' Among the Egyptians it was a religious rite. Among the Jews it formed part of the ritual of purification prescribed by Moses; and the reference to 'pools,' as Hezekiah's and that of Siloam, indicate the existence of provision for public bathing. Among the Greeks, also, the practice was familiar. It is frequently mentioned by Homer, as in the charming scene in the *Odyssey* where Nausicaa and her companions bathed in the river. The cold daily B. in the Eurotas was a prominent feature of the hardy training of the Spartans; and their use of a chamber heated with warm air supplied the Romans with the name *laconicum*. Very little, however, is known of the nature of the baths of the Athenians. Among the Romans in early times the B. was used sparingly, and only for sanitary purposes. In the days of the Empire, the appetite for it became immoderate, and it degenerated into an enervating luxury. We have abundant means of forming a clear idea of the arrangement of the Roman baths from ancient writers, from the remains in existence, as the *Thermae* of Titus, Caracalla, and Diocletian in Rome, and especially the public baths excavated at Pompeii in 1824-25, and also from the well-known picture, given below, found upon a wall in one of the rooms of the *Thermae* of Titus. The essential



Roman Baths.

parts of a Roman B. were (1) the *apodyterium*, or undressing room, connected with the *eleothesium*, or anointing room; (2) the *frigidarium*, an unwarmed room, having within it, or adjoining it, a cold B.; (3) the *tepidarium*, a chamber heated with warm air, to obviate the danger of a sudden change of temperature, and sometimes containing a tepid B.; (4) the *caldarium*, the chamber in which the hot B. was placed, was the most important part of all, and contained several objects of interest. The floor rested on small pillars, and through the flues (*suspensurae*) thus formed the heat from the furnace (*hypocaustum*) was circulated. The *laconicum* was a vapour B., the temperature of which was raised by a pipe or hollow pillar, which communicated directly with the fire, and from which the flames streamed out through the valve, or *clypeus*. The *labrum* was a shallow vase of not less than eight feet in diameter, containing cold water, with which the bathers sprinkled themselves. The *alveus* was a hot-water B., sunk in the floor. The water was heated in three vessels, placed at different heights (the cold water being highest, and the hot lowest), and connected by pipes with one another, and with the B.-rooms. The bathers took with them oil to anoint themselves, as well as *lintea* or towels and *strigiles*, to dry themselves with. The *strigiles* were scrapers, made of horn or metal, by which oil and impurities were removed from the skin. The public baths were frequented not only by the common people, but by persons of rank, and latterly even by the emperors themselves. They were opened at sunrise, and closed at sunset. The price of a B. was a *quadrans*, about half a farthing of our money. The B. was usually taken after exercise, and previously to their principal meal. At first the women bathed in company, apart from the men; but under the

Empire the custom prevailed of men and women bathing indiscriminately together. This was indeed forbidden by several emperors; but the baths became by degrees the scenes of unbridled debauchery. It was a common way of courting popular favour to give the people the free use of baths. Agrippa carried this so far as to erect 170 free baths; and he too was the first to construct the palatial edifices known as *Thermae*, where the citizens thronged to enjoy the pleasures of gymnastic exercises and of bathing, and which were splendidly adorned with pictures and statues. The baths of Agrippa were far surpassed by the baths of Titus, and they in turn by those of Caracalla, Diocletian, and Constantine. Indeed, the necessity for propitiating in this and other ways the indolent and exacting populace of Rome was one of the earliest signs, as it was one of the chief causes, of the decline and fall of the Roman empire.

The code of Mohammed enjoins frequent ablutions, and hence the practice of bathing is common in all countries that have adopted the religion of the Arabian prophet. Among northern nations the use of the B. was long unknown. Tacitus, indeed, speaks of the cold river-bath of the Germans, but this, like the plunge of the Spartan in the Eurotas, was designed to harden rather than to purify the frame. It is believed that the first knowledge which the northern Europeans obtained on the subject dates from the period of the Crusades; but, as some one has wittily remarked, a great many ages of civilisation passed over the nations of Western Europe before it occurred to the people that they ought to wash themselves. At the root of this dangerous neglect were ignorance of physiological law, and some superstition, originating perhaps in the coarser forms of monachism (unhappily not yet quite extinct even among those who hate monachism), which led men to believe that to neglect the body was to benefit the soul. The spread of the public B. in modern times is, therefore, to be hailed as a wholesome sign of the advance of morality. If it be true that a large share of the crime and disease prevalent in the lower classes of society is owing to dirt and untidiness, the institution of the public B. must be regarded as one of the most important social improvements of our age; and we may further feel encouraged to hope that it is as yet but begun, and that philanthropic and legislative effort will not pause until dirt, and foul drainage, and bad ventilation are banished to the realms of 'chaos and ancient night,' until the humble home of the mechanic is as pure and wholesome as the country-seat of the gentleman. That this result is not an impossibility, the success of the efforts of the last thirty years goes far to prove. The first public B. was opened at Liverpool in 1842, and was followed by the establishment of similar institutions in London and Edinburgh in 1844. Taking advantage of the Act of Parliament passed in 1846, the parish of St Martin's-in-the-Fields erected an extensive establishment of public baths and wash-houses, and the example of this parish was soon extensively followed in London. In all these establishments arrangements are such as to ensure cleanliness and propriety. One or two of the establishments add shower and vapour baths; others have swimming-baths; but plunge, cold, and tepid are generally the only kinds provided. The compartments for washing clothes are fitted up with every convenience. The 'wringing' is performed by machinery, and the clothes are dried in apartments heated with hot air. There is an ironing-room with all conveniences. In some of the institutions there is an ironing-board and drying compartment attached to each washing apartment. The charge is from 1d. to 2d. or 3d. per hour, according to accommodation and class.

Most of our great towns have now followed the example of London; so also have some of the Continental towns, among the earliest being Hamburg and Brussels (1852), Berlin (1853), and Vienna (1856). As early as 1855 numerous public baths had been constructed in Paris, and in that year the French government voted £24,000 to assist their establishment throughout the country. It is satisfactory to be led, as we are, to believe that in England and Scotland at least these B. and washing establishments have been so far appreciated by the community as to be generally self-supporting, or nearly so. It is also satisfactory to note that wealthy philanthropists are directing their wealth and philanthropy into this channel, and that the truth is coming to be understood and acted upon, that to benefit the human body is to benefit the human soul, and that the welfare of the two is inseparable. Mr Bell, M.P. for Derby, in June 1873, presented the borough with a free bathing

and swimming establishment. A large public B. on the Thames was also opened in 1875.

Bath (in medicine). The term B. is used to denote the complete or partial immersion of the body in a fluid or gaseous substance, for the purpose of producing some beneficial effect on the patient. Baths may consist of water varying from 30° F. to 112° F., according to the condition of the patient and the object to be gained. The effects of baths are very different, according to their temperature, and the time during which the patient is subject to their influence. The effect of a *cold B.*, of a temperature below 60° F., is first a sensation of cold accompanied by oppressive breathing in convulsive gasps. This state is due to the contraction of the cutaneous blood-vessels, and the retraction of the blood to the internal organs, and also in part to the shock upon the nervous system. This is soon followed by a feeling of warmth, and unless the patient remains too long in the B., there is invigoration of the whole system. In a B. of this temperature the patient should not remain more than five minutes. This B. is useful in certain debilitated states of the system, but is to be avoided by feeble persons, by those in whom there is a tendency to congestion of the heart, and by those in whom there is organic disease of the heart or kidneys. The *warm B.* is specially useful in the convulsions of children, inasmuch as it soothes nervous irritation, and relaxes muscular spasm. Baths, by removing mechanical obstructions, tend to promote perspiration and restore a healthy action to the skin. A *foot-B.* consists in immersing the feet and legs in water, generally used as hot as the patient can bear it. It is valuable in the early stage of congestion of the lungs, bronchitis, congestion of the heart, and allied diseases. Baths frequently contain some substance in solution, whereby their efficacy is greatly increased, as mustard in the foot-B. A B. containing nitric and hydrochloric acids, in the proportion of one drachm to two or three gallons of hot water, is specially recommended in torpid states of the liver. Various organic salts in solution often increase the value of a B., as common salt in sea-water. Soda, iodine, creosote, sulphur, and arsenic in variable proportions, have all been recommended with more or less advantage in skin diseases. A mercurial vapour-B. has been highly recommended in syphilis. This is administered by placing the patient on a chair surrounded with an oil-cloth lined with flannel, and underneath the seat is burned a small quantity of some salt of mercury, and thus the patient is soon exposed to the vapours of mercury. Many medicated baths exist naturally, as sea-water; so too with many mineral springs, as the baths of Switzerland, so highly recommended in chronic skin diseases. The Turkish B. (q. v.) consists essentially of a *hot-air B.* The wet-sheet packing, so advantageous in certain febrile states of the system, is just a modification of the cold B. As baths exert such a powerful influence on the system, they should only be taken by invalids for medicinal purposes, under the advice of a physician.

Baths and Wash-Houses, Acts regarding. In the health and welfare of the inhabitants of towns, the Act 9 and 10 Vict. c. 74 provides for the establishment of B. and W. and open bathing-places. The council of any incorporated borough may adopt this Act, and any parish not within an incorporated borough may adopt it, with the approval of the Secretary of State. In parishes not forming part of a borough, the expenses of executing the Act are to be paid out of the poor-rates, and in boroughs they are to be charged on the borough fund, or paid for by a separate rate to be levied for the purpose, the income arising from the B. and W. being applicable towards the expenses. In boroughs, the management of the B. and W. is vested in the council; in parishes not within boroughs, it is intrusted to commissioners appointed by the vestry. The council, with the approval of the Lords of the Treasury, and the commissioners, with the approval of the Treasury and vestry, may borrow money for the purposes of the Act. Corporate lands and parish lands, with consent of the Treasury, may be appropriated for B. and W. A schedule of charges is appended to the Act; by it, a cold or shower bath for one person is not to exceed a penny; a warm or shower bath, or vapour-bath, is not to exceed twopence. For four or fewer children, not over eight years old, bathing together, these charges are respectively twopence and fourpence. For higher-class baths, the council or commissioners may fix the charges at any price not exceeding three times the above charges. Wash-houses are to be provided with all requisite appliances: the charge for one hour is not to exceed a penny; for two hours,

it is not to exceed twopence. Wash-houses of a higher class to be charged as the authorities think fit. Open bathing-places, where several bathe in the same water, are to be charged, for one person one halfpenny.

Bath-Brick, a yellow, friable brick of siliceous material, largely used for metal polishing, especially in domestic economy. It is manufactured at Bridgewater from a very fine siliceous sand.

Bathgate, a town of Linlithgowshire, in the centre of a rich mining district, 17 miles W.S.W. of Edinburgh, and 24 E. of Glasgow by railway. The barony of B. belonged to Robert the Bruce, and passed to Walter the Steward of Scotland, who married his daughter; but in 1663 the charter of Charles II. made the town a free burgh of barony. The inhabitants are chiefly engaged in the coal, iron, paraffine oil, and lime works in the vicinity. The famous Torbanehill mineral or gas-coal is wrought here. Pop. (1871) 4991.

Bath, Knights of the. The origin of this order is thought to belong to the reign of Henry IV., who, it is said, at his coronation, made knights of forty-six gentlemen who had watched all night and bathed themselves before the ceremony; but the practice of bathing as an initiatory rite in knighthood reaches back probably to the dawn of chivalry. The order, which during the latter half of the 17th c. had fallen into oblivion, was revived by George I. in 1725. Its numbers were materially increased at the end of the war with France in 1815. It was, however, still purely military; but in 1847 it was opened to civilians. There are three classes:—*First class*, Knights Grand Cross (K.G.C.), limited to 50 military and 25 civil members, exclusive of the royal family and of foreigners. *Second class*, Knights Commanders (K.C.B.), limited to 92 military and 50 civil members, exclusive of foreigners. The members of both of these classes are addressed 'Sir,' and take precedence of Knights Bachelors. The first has precedence of all other knights except those of the Garter. *Third class*, Companions (C.B.), limited to 525 military and 200 civil members. They are not of the rank of knighthood.



Order of the Bath.

Bathori, a famous Hungarian family, which in the 14th c. divided into two branches, that of Ecsed and that of Somlyó, and for hundreds of years contributed men of consideration to the country. **Stephan B.** (died 1493), of the Ecsed family, is best known by his famous victory over the Turks at Kenyermező in Transylvania (1479). Another **Stephan B.** of the same family was Count Palatine in 1516, and was conspicuous by his unavailing antagonism to Zapolya, who, after the battle of Mohacz (1527), sought to obtain the Hungarian crown. **Stephan B.** of Somlyó was appointed Vaida of Transylvania by Zapolya, after the latter had been chosen monarch of Hungary. His son, **Stephan B.**, elected Prince of Transylvania in 1571, was confirmed in that dignity by the Sultan Selim II., and also by the Emperor Maximilian. He was elected to the throne of Poland, was crowned at Cracow in 1576, and reigned prosperously till his death in 1586. His uncle, **Christoph B.** of Somlyó, was Prince of Transylvania from 1576 to 1581. He invited the Jesuits into his dominions, and gave them his son **Sigismund** to educate. The result was that Sigismund became a mere tool in their hands, and after a restless career and a double abdication, died at Prague, 27th March 1613. The last B. was **Gabor** (Gabriel), a son of Stephan, King of Poland, who was Prince of Transylvania from 1608 to 1613, but provoking by his cruelties an insurrection of the nobles, was murdered at Grosswardein, 11th October 1613. His purpose was to have handed over the government of Transylvania to Matthias of Hungary, but this scheme was frustrated by Bethlen Gabor (q. v.). The name of B., however, is more likely to be remembered by the crimes of **Elizabeth B.**, niece of Stephan B., King of Poland, and married to Count Franz Nádasdy. She seems to have believed that the blood of young girls, used as a cosmetic, was effective in heightening and intensifying her

beauty, and on one occasion is said to have caused more than three hundred young women to be murdered, and to have bathed in their blood. The rumour of her horrible deeds at length became public, and the Palatine Georg Thurzó surprised the Countess in her castle, and caught a wretch in the act of torturing a maiden. Two of her women servants were beheaded, and one of her male attendants was burned alive, 7th January 1611. The Countess herself was immured in a castle, where she died in 1614. The 'process acts' of the trial of this extraordinary character are still extant.

Bat-Horses (Fr. *bât*, a pack-saddle) are horses used in military service for carrying the regimental baggage, such as books, tents, stores, medicine-chests, &c. Those who manage the horses are termed *bât-men*, and the money set aside for providing this commodity is known as *bât-money*.

Bathos (Gr. *bathos*, depth), an unconscious descent from the elevated to the mean in thought or style. The ludicrous effect produced by the essential absurdity of the transition is heightened by this unconsciousness on the part of the speaker or writer. In the *of Sinking*, written conjointly by Swift and Arbuthnot, *B.* is opposed to the sublime.

Bath-Stone, a limestone of a yellow colour much employed for building purposes, quarried from the great oolite beds in the country around Bath. When taken from the quarry, the stone is soft and easily worked, but it quickly hardens on exposure.

Bathurst, a town in New South Wales, on the Macquarie river, 122 miles W. of Sydney, with which it is connected by rail. Gold was first discovered in Australia 20 miles from B. in 1851, and gold-mining is still very extensively prosecuted in the district. B. is the third town in New South Wales, and is well built and laid out. It supports three newspapers, and has numerous industries. It is a see of the Anglican and Roman Catholic Churches. Pop. (1871) of city and suburbs, 5000; of city and district, 16,826.

Bathurst, the capital of the British possessions on the Gambia, situated on St Mary's Island, at the mouth of the river, and the residence of the lieutenant-governor. It was founded in 1816. The pop., about 3000, consists chiefly of negroes. Stores and private dwellings occupy the principal street, and African huts the others. There is a government house, an hospital, and some schools. Exports, gum, hides, wax, gold, ivory, tortoise-shell, rice, cotton, teak, and palm-oil.—**B.**, a district of Canada W., on the right bank of the Ottawa, admirably situated for trade, to the development of which the removal of the government offices to Ottawa in 1858 has materially contributed.—**B.**, an island in the Arctic Ocean, lat. 75° N., long. 100°, discovered by Sir E. Parry.

Bathurst, an English family, several members of which, during the last three centuries, have achieved distinction.—**Ralph B.**, theologian, physician, and poet, was born at Howthorpe in Northamptonshire in 1620. He studied at Oxford, took orders in 1644, and the degree of M.D. in 1654. He assisted in founding the Royal Society in 1658, but at the restoration returned to the Church, and ultimately became Bishop of Bath. He died 14th June 1704. B. wrote a good deal of Latin verse, besides several medical and theological treatises. See *W. B. n's Life and Literary Remains of R. B.* (Lond. 1761). Of their sons of his brother George, the youngest, **Benjamin B.** was raised to the order of knighthood in the reign of Queen Anne, and died in 1704. His eldest son, **Allen**, first Earl of B., was born in 1684, and, after an education at Oxford, became, in 1705, member for Cirencester. He was an ardent Tory, and was one of the twelve peers created in 1711 to enable the ministers of the day, Harley and St John, to carry certain measures through the House of Lords. Later on he was a keen opponent of Sir Robert Walpole, on whose downfall he became a Privy Councillor. In 1772 he obtained an earldom, and died in 1775. B. is best known as the intimate friend of Pope and Bolingbroke, and seems to have been a man of great good-temper, taste, and wit. His son **Henry**, second Earl, born in 1714, took to the profession of law, and reached great eminence in it. In 1754 he became Chief Justice of the Common Pleas; and in 1771 was created Baron Apsley, and was made Lord Chancellor. He died in 1794. He is the author of a *Theory of Evidence*. **Henry**, the son of the Chancellor, and

third Earl B., was a notable Tory statesman. He was born 22d May 1762, became in succession teller of the Exchequer, commissioner of the Board of Control, Master of the Mint, President of the Board of Trade, Foreign Secretary, and (in 1812) Colonial Secretary. This last office he held till 1828, when he was made President of the Council. Such was his popularity, that many localities in the colonies were named B. in honour of him. On the accession of the Whigs to power, in 1830, he resigned office, along with the rest of the ministry. A man of integrity and good business habits, he was very highly esteemed by the members of his own party, while outside of it his amiability gained him many friends. He died July 26, 1834. His son, **Henry George**, who succeeded as fourth Earl, died in 1866, when the earldom passed to his brother, William Lennox.

Bathybius, the name applied to undefined masses of protoplasm existing in the beds of the oceans, and having imbedded in their substance minute calcareous bodies known as coccoliths. These coccoliths are frequently found associated together in the form of spherical masses termed *coccospheres*. The living protoplasmic B. has been assumed to be a Foraminiferous or animal organism allied to those which inhabit the sea-beds, whilst the coccoliths are presumed to be unicellular *Alga* or low sea-weeds, the coccospheres being the sporangia or seed-cases of these *Alga*. Their presence in B. would in this view be of an accidental kind. It has recently (October 1875) been asserted that B. has no real existence as an organism; the protoplasmic appearance being probably derived from the decomposing sarcoid matter of other organisms.

Bat'ides, a division of *Elasmobranchiate* fishes, represented by the *Skates* and *Rays*, in which the mouth and gill-openings are situated on the under surface of the body, which is generally greatly flattened and broadened. This broad appearance is given to those forms by the large size of the pectoral or breast fins, which are concealed beneath the skin, and thus add to the breadth of the body. The upper surface of the body bears the eyes and *spiracles* or apertures of tubes by which water may be admitted to the gills.

Bat'ignolles. See BAGNOLET.

Bat'ley, a town in the W. Riding of Yorkshire, 2 miles N. of Dewsbury, and a station on the London and North-Western Railway. It has a church, in the Perpendicular style, built in the reign of Henry VI., and also a handsome public hall. It is the chief town in the kingdom for the manufacture of army cloths and coarse woollens. There are over thirty factories. Pop. (1871) 20,871.

Batn-el-Ha'gar ('womb of rocks'), a wild, stoney region in Nubia, traversed by the Nile, and lying S. of the second cataract, in lat. 21°-22° N., and long. 30° 40'-31° 10' E. It is almost destitute of vegetation, beans and the fruit of the *ker-keddan*, a hardy shrub, being the chief food of the inhabitants, who are chiefly Beduins.

Bat'on, in heraldry, another name for the Bastard Bar (q. v.).

Baton, the name given to the short staff of a field-marshal, a drum-major's long staff, the wand of the conductor of a musical choir, and a policeman's truncheon.

Baton Rouge, a town, and formerly the capital, of the State of Louisiana, on an eminence on the E. bank of the Mississippi, 150 miles by the river above New Orleans. Pop. (1870) 6498. The district is very fertile, and produces abundantly cotton, sugar, and maize. B. R. was the scene of several important operations during the American civil war.

Batrach'ia. This term is used by Owen synonymously with AMPHIBIA (q. v.), to denote a distinct class of *Vertebrate* animals, represented by the frogs, toads, newts, land-salamanders, and allied forms. The name B. is used by Huxley to denote the *order* of Amphibia represented by the frogs and toads. The B. were formerly, and in some systems of classification still are, included in the class of *Reptiles*. But this arrangement is inconsistent with the structure and true nature of the amphibia, which possess much nearer relations with the fishes than with reptiles. The fishes and amphibia are thus included to form the *Branchiate* vertebrata, or those which breathe by *gills* or *branchia* at some period of life, or during their whole existence;

and Huxley has included these two classes to form his province of the *Ichthyopsida*, or 'fish-like' vertebrata. The B. are distinguished, firstly, by the fact that in early life they all possess gills, and later become provided with lungs. The invariable presence of gills in early life, and lungs in adult life, is the first great characteristic of these forms. The gills in some amphibia (as in frogs, toads, &c.), disappear when the lungs of adult life are developed; but in other B. (such as *Proteus*, *Axolotl*, *Siren*, &c.), the gills remain throughout life, and the animals in their adult state thus breathe both by gills and lungs. The limbs when present are not, as in fishes, converted into fins, and are supported, as in higher vertebrata, by definite appendages of the true or internal skeleton. The amphibia may possess *central* or *median* fins placed like those of fishes along the back or under the surface of the body, but such fins are never, as in fishes, supported by *fin-rays*. The skin of existing B. is generally destitute of any outside skeleton or external hard parts, such as scales or bony plates. Some forms (e.g., *Cæcilia*, *Ophippiger*) possess small scales concealed under the skin. In one extinct Batrachian genus (*Labyrinthodon*), an outside armour of bony plates was developed on several portions of the body. The skin in amphibia is thus usually soft and moist, and greatly aids in the breathing process of these forms. The skeleton of amphibians is always formed of true bone. Ribs are either wanting or rudimentary in these forms; the place of these bones being supplied (as in frogs, &c.) by the long transverse processes of the vertebrae. The skull is joined to the spinal column by two *occipital condyles*—a feature highly distinctive of the amphibia. The *Cæciliada* or amphibian blind-worms found in tropical regions, of all the B. alone want all the limbs. *Siren*, an American form, alone wants hind-limbs—and in all other amphibia, both fore and hind limbs are developed, although the limbs may be of a weak or rudimentary nature. Simple teeth generally exist, and are borne upon the other bones of the mouth besides the jaws. In some forms (e.g., Surinam toads) no teeth may be developed. The tongue may be undeveloped (as in Surinam toads and *Dactylethra*), or it may be fixed to the floor of the mouth (as in newts, &c.); whilst in frogs, toads, &c., the tongue can be protruded from the mouth, but is fixed to the front of the lower jaw instead of to the back of the mouth. Salivary glands are wanting, as such, in B. The digestive system is simple; the intestines ending in a *cloaca*, or cavity common to the digestive, urinary, and generative systems. The heart in all consists of two auricles and a ventricle. The impure blood from the body is returned to the right auricle, and is sent thence into the ventricle. The pure blood from the breathing organs is sent into the left auricle, and thence into the ventricle, so that a mixture of the venous or impure, and arterial or pure blood takes place in the ventricle, from which cavity the mixed blood is circulated through the body. This imperfect circulation is one well calculated to serve the slow, torpid lives of these creatures, and is characteristic of adult amphibia; the younger stages, as will be presently noticed, possessing a different circulation. The eyes are small, and are covered by skin in *Proteus*, *Pipa*, and the *Cæciliada*. The nostrils in all open posteriorly into the mouth. The sense of touch is subserved by the skin. A urinary bladder and kidneys exist in all. A very important and distinctive character of Batrachians is the occurrence of *metamorphosis*. The young (as in the frog) leave the egg as *tadpoles*. These larval forms soon develop external gills from the sides of the neck; these outside branchiæ soon disappearing, and being replaced by internal gills, borne upon the branchial arches. The hind-limbs then appear, and the fore-legs follow in order of development. Then the lungs are formed, and at this stage the tail and gills disappear, the frog leaving the water, and breathing throughout its future life by lungs alone. In other forms (e.g., *Proteus*, *Siren*, &c.), the external gills of early life are retained throughout the whole existence, lungs being developed in addition to the gills, and such forms are thus truly *amphibian*, being thus provided with two sets of respiratory organs.



Young or Larval Form of Triton.

In the tadpole, or larval state, breathing is solely performed by gills, and the heart then consists of a single auricle and ventricle, and of an arterial bulb as in fishes, and the purified blood from the gills passing to the body without returning to the heart. When lungs are developed, the pulmonary or lung arteries carry a certain proportion of the blood to these new breathing-organs, and thus the gills and lungs—in those forms in which both sets of breathing organs exist—each participate in the respiratory process. In those forms in which, like the frog, the gills of early life disappear, the pulmonary arteries grow larger and larger as the lungs are developed, the gills being deprived of blood, and thus shrivelling up; whilst the pulmonary arteries, or those which return the blood from the lungs, also increase in size, and develop a second (the left) auricle of the heart at their lower portion. The circulation then proceeds by means of the three-chambered heart as already described.

The different groups and animals of amphibia are described in articles relating to each group or animal.

Batrachomyomachia (Gr. 'the war of the frogs and mice'), a Greek mock-heroic poem parodying the *Iliad*. The author was not Homer, as popularly supposed in ancient times; but probably (as stated both by Suidas and Plutarch) Pigres, brother or son of the famous Carian queen, Artemisia. A good edition is that of Barmmeister (Gött. 1852).

Batrachus. See FROG-FISH.

Batsch, August Johann Georg Karl, a German naturalist, born at Jena, 28th October 1761, studied medicine under Gruner, Loder, and others, established himself as a physician at Weimar in 1781, and devoted his leisure to researches in natural history. After 1787 he successively filled at the University of Jena the functions of interim professor of natural history and medicine, titular professor of philosophy, and director of the society for the advancement of natural science. He died 29th September 1802. B.'s works are numerous and valuable. The principal are, *Elenchus Fungorum* (Halle, 1783); *Versuch einer Anleitung zur Kenntniss und Geschichte der Pflanzen* (Halle, 1787-88); *Versuch einer Historischen Naturlehre* (Halle, 1789-91); *Blumenzer gliederung aus verschiedenen Gattungen der Pflanzen* (Halle, 1790). A work remarkable for its new and original observations; and *Tabula Affinitatum Regni Vegetabilis* (Weim. 1802), in which one finds the first attempts at classification by natural families.

Batahian, one of the island groups of the N. Moluccas, taking its name from the principal island of the group, which lies S.W. of Gilolo, from which it is separated by the Patientia Strait, between lat. 0° 11'-0° 54' S., and long. 127° 10'-127° 27' E. Its chief products are rice, cloves, and sago. It also contains gold, copper, coal, and hot springs. A mountain range runs through the island, with many peaks from 2270 to 4050 feet high, and these are clad by forests of ebony, nutmeg, and satinwood, abounding in deer, wild hogs, reptiles, and birds of splendid plumage. Area 900 sq. miles; pop. not known. The chief village is Amassing, which lies on the W. shore of the island, at the head of a deep bay. The group, which is volcanic, consists of some twelve other islands, of which the largest are Kasiruta and Mandoli. These are in great part mountainous and sterile. See Bernstein's *Reisen in den Nördlich. Molukken* (1873); and Dr Petermann's *Mittheilungen* (vol. xix. part 6, 1873).

Batt's, an allowance made to British officers in India in addition to their pay. *Dry B.* is money given instead of rations; *wet B.* is given in kind; *full B.* is given when the troops are in the field, or above 200 miles from the capital of the presidency; and *half B.* when they are in garrison or cantonment within 200 miles from the seat of government.

Battalion, a division of infantry of variable size, comprising at present, in the British army, about 800 men, and seldom in any nation containing more than 1000 men even in time of war. In the British army, regiments consist of one or two battalions, except in the case of two, each of which comprises four. A B. is usually subdivided into twelve companies, of which those placed at the extremities of the line formed when the B. is drawn up in parade, and known as the 'grenadier' and 'light infantry' companies, are designated the wings. See REGIMENT.

Battas, a free people in the interior of Sumatra, neither of Negro nor Malay race, and without any kind of government. They are industrious, friendly, and hospitable, claim to be the first settlers in the island, and have a primitive form of religion. Cannibalism, however, is practised among them to a limited extent. They have been described by Junghuhn in his *Battaländer auf Sumatra* (1847).

Battaszek, properly *Bataszek*, a town in the county of Tolna, Hungary, near the right bank of the Danube, 10 miles W. of Maria Theresienstadt, produces excellent wine. Pop. (1871) 6542.

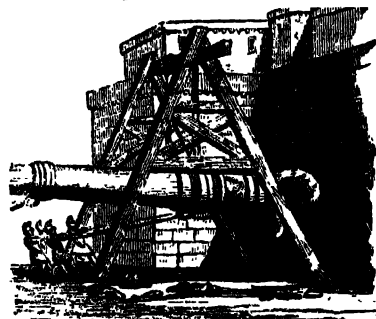
Battel, **Trial by**. In former times, in civil and criminal cases, the defendant had a right to appeal to this mode of deciding on whose side justice lay. It consisted in a battle with baton and target between opposing parties or between their champions. They fought from an early period of the day, either till one was killed or till twilight; and whoever killed his opponent, or had the best of the fight when the stars began to twinkle, was held to be victor, and consequently winner in the suit. In England, so late as 1818, the defendant in a case (*Ashford v. Thornton*) claimed the right of appeal to T. by B., and Lord Chief-Justice Ellenborough and his brother judges sustained the appeal. 'Whatever prejudices,' said Lord Ellenborough, 'may justly exist against this mode of trial, still, as it is the law of the land, the court must pronounce judgment for it.' The combat did not however take place, and an Act was passed abolishing T. by B. In Scotland, and in the nations of Europe, the legal doctrine is that a statute may become obsolete. In England the legal doctrine is that a statute has force until it has been repealed. The above incident should, we think, lead to some modification of the English doctrine.

Batten, the swing-frame of a hand-loom that beats home the weft or woof to the web, and along the bottom of which, on a ledge, the shuttle travels. The same instrument in Scotland is called the *lay* or *lathe*.

Battens, in carpentry, strips of wood from 2 to 7 inches broad, and from $\frac{1}{2}$ to 2 inches thick, used in walls for securing the laths before the plaster is laid on; on roofs the slates are nailed to them; they are employed also as flooring.

Batter, in architecture, when used as a verb, denotes that a wall slopes gently backwards; as a noun, it is the name given to a backward slope in a wall.

Battering-Ram, a military engine employed among the ancients for the demolition of stone walls. It consisted of a beam of wood, to one end of which was attached a metallic mass, usually resembling a ram's head. The force of the blow was derived either from the simultaneous thrust given to the ram by the soldiers bearing it, or simply from the momentum of the ram itself, which, in this case, was suspended pendulum-fashion from a frame.



Battering-Ram.

For the protection of those working it, a wooden roof (*testudo*) covered it, the whole apparatus moving on wheels.

Battersea, a suburb in the S.W. of London, in Surrey, on the S. bank of the Thames, and nearly opposite Chelsea, with which it communicates by means of B. Bridge, Albert Bridge, Chelsea Suspension Bridge, and also by a railway bridge. It was formerly famed among botanists on account of its fertile 'fields,' subsequently converted into the well-known public park which, since 1870, has been beautifully ornamented.

Battery, in criminal law, means an attack on any one by physical force. We restrict consideration of the subject under this title to cases in which insult alone is intended. The subject is further treated of in article *Beating and Wounding* (q. v.). To constitute the criminal offence of B., it is not necessary that

there be any intention on the part of the aggressor to injure or wound the person whom he assaults. The law does not permit any one even to touch the person of another in a rude or insulting manner; and any one so insulted has ground either for an action for damages, or he may proceed against the offender by a criminal indictment for a misdemeanour. It is essential, however, to sustain either procedure, that the offence complained of be serious in its effect; and it may be a sufficient defence that no harm was intended; or that the defender's position towards the plaintiff authorised the act complained of; as that the former was the father, guardian, or master of the latter. When the B. is towards a man's wife, procedure and reparation are regulated by statute of 16 and 17 Vict. cap. 76.

Battery (Fr. *batterie*, from *battre*, to beat), a military term of various significations. In the Army Regulations published in 1873, it is applied to a number of artillerymen, corresponding to a troop of cavalry or a company of infantry. There is a *field-B.*, in which the men are on foot and the officers mounted; and the *horse-B.*, in which both officers and men are mounted. The number of men and officers in each is proportioned to the weight of the ordnance: a field-B. of six 12-pounder rifle-guns consisting of 158 in time of peace, and of 277 in time of war. In a wider sense of the term B. it includes also the pieces of ordnance under the charge of these men, together with the horses, gun-carriages, ammunition-waggons, and other necessary *matériel*. In the British army a B. consists of 6 pieces of ordnance; in the French army, 6—under the Empire it was 8; in the German army it may be 4, 6, or 8 pieces; while in the Russian army it is 12.

A third meaning of the term B. has no reference to horses or waggons. In this sense it denotes two or more guns placed in position for attack or defence, called the *siege B.* and the *B. for defence*. There are many names for batteries in position, but there is a general similarity in their construction. The parapet is thrown up for shelter, and the guns are placed behind it. The platform on which the guns rest is the second general feature; the other is the ditch outside the parapet. According to the level on which the gun is placed, there is the *cavalier B.*, which fires over the enemy's parapet; the *elevated B.*, which has its guns on the natural level of the ground, the parapet being formed of earth dug up in front of it; the *half-sunken B.*, which stands in a shallow trench, the earth for the parapet being partly dug from behind; the *full-sunken B.* which is down in a ditch, the earth being all dug from behind. The kind of ordnance used gives name to the *gun*, the *howitzer*, and the *mortar B.* According to the direction or manner of firing, there is the *breaching B.*, which fires straight against the enemy's works, or *point blank* as it is called; the *enfilading B.*, which stands at right angles to the line of the enemy's rampart, and sends its shot so as to graze the interior of his parapet in the direction of its length; the *ricochet B.*, which discharges its shot so that it makes low bounds along the ground, with a view to its dropping over the parapet and disabling the enemy's gunners. In placing a *siege B.*, the guns are sometimes arranged parallel to each other, sometimes as portions of a triangle, at other times as portions of a polygon. See *Fortification*, *REDAN*, *EPAULEMENT*.

Battery, Electric and Galvanic. See *ELECTRICITY* and *GALVANISM*.

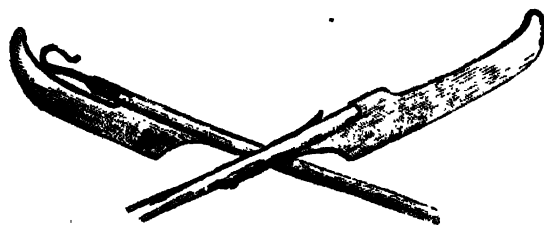
Battery, Floating. See *FLOATING BATTERY*.

Bathyan'yi, an ancient family of Hungarian magnates, taking its name from the territory of Battyán. Among its members who appear in history may be mentioned: 1. **Benedict**, who was treasurer to Vladislav II. (the Bohemian) about the time of the Hungarian peasant war.—2. **Balthasar**, who fought against the Turks in the time of Mohammed III. and Prince Mansfield.—3. **Charles Joseph, Prince B.**, born 1697, was an eminent field-officer in the Austrian service; he defeated the French-Bavarian army under Ségur at Pfaffenhofen in 1745, and was opposed to Frederic II. in the second Silesian war.—4. **Louis, Count B.**, was born at Presburg in 1806. He was a member of Kossuth's Nationalist party, against Chancellor Appony and the 'administrator' system. In 1848 he was president of the experimental ministry under Archduke Stephen as Palatine, and carried through the constitutional laws of 11th April. He tried to settle the Croatian question, and, in spite of the appearance of Ban Jellachich's army, he worked to the last for a political union with Austria. Subsequently, he persuaded

the Diet of Pesth to attempt a settlement with Windischgratz before hostilities began. B. did not fly with the Committee of Safety to Debreczin, but was captured at Pesth, and put to death at Vienna, 6th October 1849. See Horvarth, *Louis B., Martyr Politique*, 1850. In 1870 a festival was held in his honour, and his corpse was taken from the grave for the occasion.—5. Oasimir (Oount), born 4th June 1807, a leading opposition member in the diets of 1840–43–44, and President of the Ved-Egylet (society for encouraging national production of all kinds). Emancipation of the serfs and publication of works in native speech were two of his objects. In 1848 he became 'Obergespan' in the district of Barany, and successfully held Essek and the navigation of the Drav and Danube against the Croatian army. On the proclamation of independence in 1849, B. became Minister of Foreign Affairs; and through the struggle which ended with the dictatorship and surrender of Görgei he shared the fortunes of Kossuth, with whom he was 'interned' by the Turkish government in Schumla and Kutayah till 1851, when he went to France, and died at Paris, 13th July 1854. A Prince B. occupies at present a prominent position on the French turf.

Battle, a market-town in E. Sussex, 8 miles N.W. of Hastings. In the neighbourhood there are extensive works for the manufacture of gunpowder, for the excellency of which B. has long been celebrated. Pop. (1871) 3495. B. derives its name from the decisive victory won by William the Conqueror, October 14, 1066, on the heath between B. and Hastings, and which is commonly called the battle of Hastings. The following year William founded B. Abbey on the heath, endowed it with all the land within a league, and ordered prayer to be perpetually offered for the repose of the souls of all who had fallen in the conflict. B. Abbey had the privileges of a sanctuary. The abbot was mitred, freed from the authority of the metropolitan of Canterbury, invested with archiepiscopal jurisdiction, and possessed the prerogative of pardoning a criminal on his way to execution. In the abbey church were long preserved the sword and coronation robe of the Conqueror, as well as the roll of the chief nobles who had accompanied him to England. But the ancient pomp and solemnity are gone. 'The perpetual prayer has ceased for ever, the roll of B. is rent, the shields of the Norman lineages are trodden in the dust, the abbey is levelled with the ground, and a dank and reedy pool fills the spot where the foundations of the quire have been uncovered' (Palgrave, *Hist. of the Anglo-Saxons*, p. 328); yet the ruins, which occupy three sides of a quadrangle, are still extensive.

Battle-Axe, a weapon formerly employed in battle for purely offensive purposes. It was not in use among the Greeks



Battle-Axes.

and Romans, but was extensively used by the Gauls and the northern nations. In England, Scotland, and Ireland it was well known.

Battlement, in architecture, a wall or parapet with embrasures, or notches, through which to shoot missiles, or to watch. It was originally used only in fortifications; but was afterwards employed for ornament on ecclesiastical and other edifices.

Battle, Military. The manœuvring by which a general endeavours to gain preliminary advantage over his adversary—that is, the securing of his own line of communications, the cutting off of his enemy from his base, or putting him into disadvantageous position for battle—is called Strategy (q. v.). The manœuvring on the field is called Tactics (q. v.). On both of these elements will the result of a M. B. plainly depend. If troops are weakened from inadequate supply of food, and if they feel that their commander has been outwitted, there is

both a physical and a moral obstacle to contend against; and victory is seldom on the side of those who have lost confidence. Assuming equality, or something near it, in force and animus of opposing troops, victory must fall to the general who succeeds in being the stronger at that point of attack at which to prevail is to divide the force of the enemy, so that each division may in succession be attacked by a decidedly stronger force. Such were the tactics of Napoleon. He formed his attacking force into a column, which he threw in overwhelming force against the centre of his enemy; having cut through which, he was generally able to throw his whole force against one-half of that of the enemy, this half being thus commonly routed before the other could come to its support.

Battle, Naval. The grand endeavour in a N. B. was to get the 'weather-gage' of the enemy; that is, to get to windward of him. This gave the superior power of navigation, and subjected the opponent to the inconvenience of the smoke. To break the enemy's line, and then, by tacking 'in its rear, to place his ships between two fires, was a favourite plan of the British naval commanders during the French war. It was thus that Nelson won the battle of the Nile. Under steam, and with the ironclad ships and tremendous ordnance and appliances of our own day, the theory of naval tactics has wholly changed. It is plain that battles will not now be decided almost hand to hand as formerly, but with the hostile vessels at a distance of two or three miles from one another.

Battue, a beating of the trees and underwood of preserved lands (Fr. *battre*, to beat), in order to raise and drive the game to a certain spot, where the sportsmen have agreed to take their stand, and bring down the advancing game. The common, but inaccurate, use of the word is to signify, not the beating of the birds, &c., out of cover, but the slaughter of them by the sportsmen after they have been so beaten out. In this sense the annual pigeon-shooting matches at Hurlingford may be described as battues; though in this case the game is not beaten up from cover, but brought up in baskets and liberated on the spot. Though the term B. is modern, the practice of driving game together and destroying them is old, and perhaps universal; and when justified by the necessity of providing a large quantity of food to meet an emergency, or in a locality in which game may be rapidly passing to a distant feeding station, is unobjectionable. As sport, however, the B. may be regarded as the cruel and foolish method in which gentlemen take over into their own hands the legitimate work of the slaughterman.

Batum, or **Batumi** (anc. *Bathyr*), a seaport in the vilayet of Trebizond, Turkish Armenia, on the E. coast of the Black Sea, with a good harbour. It is very unhealthy, and there are several ruins in the vicinity belonging to the period of the middle ages. Pop. 3000.

Baturin, a town of European Russia, government of Tchernigov, on the Selma, founded by Stephen Bathory, and for a time the residence of the Hetmans of the Ukraine Cossacks, of whom the notorious Mazeppa was one.

Baud, a small town of France, department of Morbihan, on the Blavet, 16 miles from the sea, and 75 miles S.E. of Brest, with some trade in cattle and agricultural produce. It has a very ancient chapel, and in the vicinity is a rude statue called the Venus of Quinipily. Pop. (1872) 1446.

Baur, **Bruno** (not to be confounded with an earlier theologian, author of *Hebrew Mythology of Old and New Testaments*, 1802), born at Eisenberg, 6th September 1809, studied and graduated in theology at Berlin. From 1839 to 1842 he lectured in theology at Bonn. On being suspended, he retired to Berlin, where he has since remained. His suspension gave rise to an acrid controversy among the Prussian universities as to the liberty of teaching given to licentiates and professors in theology and philosophy (*Gutachten der evangelischen theologisch Facultäten*, &c., Berlin, 1842). B. was from the first a rationalist, but in his early works, e.g., *Criticism of Strauss's Life of Jesus* (1835–36), and *Critical Exposition of the Religion of the Old Testament* (1838), he has not abandoned the hope of extracting a positive historical faith from the documents. In his critical works on the Gospels which appeared in 1840–42 (which Renan classifies with those of De Wette and Wilhe), B. entirely rejects the idea of Strauss that the Gospels arose naturally in accord-

ance with a pre-existing Christology, or Messianic tradition, and maintains that the Messianic idea is not Judaic, but derived entirely from the contest between the Christian Church and the Synagogue. Rejecting the fourth Gospel, and not even admitting the partial authenticity of Mark, B. seems almost to doubt the historical existence of Christ, whom he nevertheless represents as the author of an 'ungeheures werk.' He accuses Strauss of orthodox prejudice; and, as Renan observes, makes too much of his own persecution. His rather intemperate spirit is shown more clearly in his *Trumpet of the Last Judgment, or Hegel the Atheist and Antichrist*. The year 1843 was spent by B. in writing *Christianity Unveiled*, a satirical work in which he defends the agnostic position, and a pamphlet against Jewish emancipation. The next few years produced able and learned historical works on the 18th c. and its results, written with a constant reference to the political situation of the day. In 1850-51 he returned to theology, publishing critical works on the Gospels and the history of their origin, and on the Epistles of Paul. B. has great acuteness, fervour, and industry, but he wants the scientific impartiality so necessary in theological criticism.

Bau-gé, the chief town of an *arrondissement* of the same name, France, department of Maine-et-Loire, on the Couesnon, 23 miles E.N.E. of Angers, with some manufacture of linens, woollens, and wooden shoes. Pop. (1872) 2891. B. owes its origin to Foulques-Nerra, and was an important town in the middle ages. In 1421 the English, under the Duke of Clarence, were defeated here. The residence of the mayor is a château of the 15th c., with a magnificent staircase.

Bauhinia, a genus of plants belonging to the natural order *Leguminosæ* (sub-order *Casalpinceæ*), consisting of numerous species, natives chiefly of the tropics of India and Brazil. The greater number of them are gigantic climbers, only a very few are trees or large shrubs. *B. Vahlii*, the Maloo climber of India, is a shrubby climber often 300 feet in height, whose woody stem will frequently overtop the tallest trees of the forest, and by compressing their trunks strangle them to death. The fibrous bark of this and other species are employed in making ropes, used in the construction of the suspension-bridges slung across the upper waters of the Jumna. *B. tomentosa* is a small tree of Ceylon, the flowers of which, from being spotted with crimson, are popularly believed to be sprinkled with the blood of St Thomas. The dried buds, flowers, and leaves, form a native remedy in dysentery. *B. variegata* is a small tree of about 20 feet in height, a native of India, China, and the Molucca Islands, and is also now naturalised in some of the W. Indian islands. Its wood is sometimes called ebony. The bark is employed in medicine, and in dyeing and tanning leather in India. The bark of another Indian species is used in making the slow matches used with the native firelocks. Most of the plants of the genus *B.* have leaves composed of two lobes; hence it was named in honour of the brothers Bauhin, its twinlike leaves being supposed to be symbolical of those botanists, whose labours were generally given to the world in the form of works, their joint authorship.

Baumgarten, Alexander Gottlieb, the founder of *Æsthetics* (q. v.), or the philosophy of the beautiful, was born at Berlin, 14th July 1714, studied at Halle under Wolf, and was appointed Professor of Philosophy at Frankfort-on-the-Oder, where he died, 26th May 1762. His *Æsthetica*, the work in which his special philosophy is developed, was published in two vols., Frankf. 1750-58. His *Metaphysica* (Halle, 1739, 7th ed. 1779) is still thought highly of.

Baumgarten-Cru'sius, Ludwig Friedrich Otto, a distinguished German theologian, was born at Merseburg, 31st July 1788, became Professor of Theology in the University of Jena, where he died, 31st May 1843. B.'s chief works are *Lehrbuch der Dogmengeschichte* (2 vols. Jena, 1831-32); *Compendium der Dogmengeschichte* (2 vols. Leips. 1840-46); *Handbuch der Christl. Sittenlehre* (Leips. 1827); *Grundzüge der Bibl. Theologie* (Jena, 1828); *Exegetische Schriften zum neuen Testament* (3 vols. Leips. 1844-48). B. had a tendency to the pious rationalism of Schleiermacher.

Baumgartner, Andreas Freiherr von, born at Friedberg, in Bohemia, 23d November 1793, was educated at Linz and Vienna, and published his first work, *Aräometrie* (Vien. 1820), while a teacher in the Lyceum of Olmütz. In 1823 he was appointed Professor of Natural Philosophy in the Vienna Uni-

versity, and in the same year published his *Mechanik in ihrer Anwendung auf Künste und Gewerbe*, and his *Naturlehre*, the latter of which was extremely popular, and was in its 8th ed. in 1844-45. In 1846 B. was intrusted with the establishment of the Austrian electric telegraph. Five years later he was appointed Minister of Commerce, Trade, and Public Buildings; and was also elected President of the Austrian Academy of Sciences. In 1851 he was made a baron of the Austrian empire, and in 1861 a member of the Imperial Council of the House of Lords. He died 30th July 1865. B.'s principal works are, *Chemie und Geschichte der Himmelskörper nach der Spectralanalyse* (1862), *Die mechan. Theorie der Wärme* (1864), and *Freiherr von B., Eine Lebensskizze*, published in 1866 after his death.

Baumgartner, Gallus Jakob, a Swiss statesman, born 18th October 1797 at Altstätten, in the canton of St Gall, and died in July 1870. He was noted among his countrymen for his devotion during the greater part of his career to the *parti prêtre*, vindicated the Jesuits, opposed the armed suppression of the *Sonderbund*, and displayed in a variety of political offices great oratorical and much administrative power.

Baumgärtner, Karl Heinrich, a distinguished physiologist of Germany, was born at Pforzheim, 21st October 1798, and since 1824 has been Professor of Clinical Therapeutics at Freiberg. He may be considered the originator of the cell-theory, subsequently worked out and expounded by Schwann. Among his writings are *Über die Natur und die Behandlung der Fieber* (Freib. 1827); *Handbuch der speziellen Krankheiten und Heilungslehre* (2 vols. 1835, 4th ed. 1840); *Dualistisches System der Medicin* (Stuttg. 1835-37); *Lehrbuch der Allgem. Pathologie und Therapie* (1837, 3d ed. 1854); *Schöpfungsgedanken* (1856-59).

Baupettah, a town of India in the province of Madras, 29 miles from Guntur. Pop. about 20,000.

Baur, Ferdinand Christian, a distinguished German theologian, born 21st June 1792, at Schmidlen, near Cannstadt, was the founder of the Tübingen school of theology. His first important work was *Symbolik und Mythologie, oder die Naturreligion des Alterthums* (3 vols. 1824-25), while a professor at Blaubeuren. In 1826 he was called to the chair of Protestant theology at Tübingen, which he held till his death, 2d December 1860. His first work was a useful preparation for his after labours, implying as it did a general acquaintance with the genius of antiquity. The task he set before himself, and to which he devoted his life, was to supply, in a thoroughly free spirit, what was yet wanting for the comprehension of early Christian literature. Strauss had previously sought to show only what the Gospels are not; B. sought to discover what they are,—to disclose the peculiarities of their structure, and to show how all the New Testament writings grew out of contemporary circumstances. The aim of previous criticism had been to expose the alleged discrepancies and contradictions of the Christian literature, especially of the Gospels; the object of B. was to restore the continuity of the New Testament history, and link the facts intelligibly together. Among B.'s works are *Die Christl. Gnosis, oder die Christl. Religionsphilosophie* (Tüb. 1835); *Die Christl. Lehre von der Versöhnung* (Tüb. 1838); *Die Christl. Lehre von der Dreieinigkeit und Menschwerdung Gottes* (3 vols. Tüb. 1841-43); *Lehrbuch der Christl. Dogmengeschichte* (Stuttg. 1847, 3d ed. 1867); *Paulus, der Apostel Jesu Christ* (Stuttg. 1845, 2d ed. 1867); *Kritische Untersuchungen über die Kanon. Evangelien; ihr Verhältniss zueinander, ihren Ursprung und Charakter* (Tüb. 1847); *Das Christenthum und die Christl. Kirche der drei ersten Jahrhunderte* (Tüb. 1853, 3d ed. 1863); *Die Christl. Kirche vom Anfang des 4. bis zum Ende des 6. Jahrh.* (Tüb. 1859, 2d ed. 1863); *Die Christl. Kirche des Mittelalters* (Tüb. 1861, 2d ed. 1869). See Mackay's *Tübingen School*.

Bautain, Louis Eugène Marie, a French philosopher and theologian, was born at Paris, 17th February 1796. After studying at the Normal School, he became Professor of Philosophy at Strasbourg College, then Dean of Faculty of Literature, and, lastly, Director of the College of Juilly. In 1828 he entered the Church; was suspended for several years for heresy contained in his *La Morale de l'Évangile comparée aux divers Systèmes de Morale* (1827), but latterly became Vicar-General or Promoter to the Archbishop of Paris. He held for some years a chair in the Theological Faculty of Paris. B. is a mystic in philosophy, but, like his master, Cousin, he is extremely eloquent. He died

October 18, 1867. B.'s chief books are his *Psychologie-Experimentale* (Strasb. 1839, 2d ed. 1859), *Philosophie Morale* (Par. 1842), and *Philosophie du Christianisme* (1835).

Bautzen (Slav. *Budissen*, 'the huts'), capital of the circle of B., kingdom of Saxony, stands on a height overlooking the Spree, 33 miles E.N.E. of Dresden. It is well built; has several churches, a cathedral, with a tower 300 feet high, a palace, once the residence of the Markgrafs of Meissen, and an hospital. It has manufactures of woollens, linens, hosiery, tobacco, &c., and is an important commercial centre. Pop. (1871) 13,165. B. was already in existence when the Emperor Heinrich I. founded the Markgrafdom of Lausitz in 931, but it first became a town and a fortress in the time of his successor, the Emperor Otho. It suffered much in the Hussite wars, the Thirty Years' War, and the Seven Years' War, but is best known in modern times as the scene of the defeat of the combined Russian and Prussian forces by Napoleon, May 20 and 21, 1813.

Bavaria (Ger. *Bayern* or *Baiern*), next to Prussia the largest kingdom in the German empire, lies in Middle and Lower Germany, between lat. $47^{\circ} 20' - 50^{\circ} 41' N.$, and long. $9^{\circ} - 13^{\circ} 48' E.$ It is bounded N. by Hesse-Nassau, the Thuringian principalities, and the kingdom of Saxony; W. by Würtemberg, Baden, and the Grand Duchy of Hesse; E. by Bohemia and Austria; and S. by the Tyrol. It also includes an outlying portion called *Bayern Pfalz*, or the Rhenish Palatinate, situated in an angle between the province of Alsace-Lorraine and the left bank of the Rhine. The frontier has a total length of some 1280 miles, and the following are the divisions, areas, and populations, excluding the military:—

Circles.	Area in Square Miles.	Pop. in 1871.
Upper Bavaria	6,493	841,707
Lower Bavaria	4,091	603,789
Palatinate (Pfalz)	2,272	615,035
Upper Palatinate, with Regensburg	3,679	497,861
Upper Franconia	2,632	541,663
Middle Franconia	2,914	383,666
Lower Franconia, with Aschaffenburg	3,409	586,132
Swabia and Neuburg	3,648	582,773
Total	29,138	4,863,450

Character of People, Religion, and Education.—The principal towns are Munich, the capital, Nürnberg, Augsburg, Würzburg, Bayreuth, Regensburg, Fürth, and Bamberg. The people in the N. are industrious, intelligent, and sprightly; the Swabians are sturdy, good-natured, and independent; but the Bavarians proper are a heavy, taciturn, and superstitious race. In 1872 the Roman Catholics numbered 3,464,364, the Protestants 1,342,592, Jews 50,662, and the members of various other small sects 5453. There is the utmost religious toleration, but the state of late years has shown itself opposed to Ultramontanism by favouring the 'Old Catholics,' and by its expulsion (1873) of the Jesuits. The system of education is compulsory, and is under the direction of a Minister of Public Instruction, who is assisted by several members of the provincial government, under whom again there is a large body of regular inspectors. Children are obliged to attend school until their 14th year, and for two years longer are required to go to a Sunday-school. B. has three universities—(1) Munich, with (1873) 77 professors and 1219 students; (2) Würzburg, with 43 professors and 803 students, both Catholic; and (3) Erlangen, with 43 professors and 371 students, Protestant.

Physical Features, Mountains, Rivers, &c.—The country is for the most part hilly. The S. half of B. forms the middle part of the Bavario-Swabian plateau between the Iller and the Inn, and is hemmed in on the S. by the Noric Alps, from 3000 to 12,000 feet high; the Böhmerwald on the E. separates B. from Bohemia; and on the N. rises the Rhöngebirge. The central area is intersected by several low mountain chains, and consists alternately of fertile valleys, wide plains, and extensive forest tracts. Among the highest peaks are the Zugspitz, 10,150 feet high, in the Noric Alps; the Arber, 4613, and Rachelberg, 4561, in the Böhmerwald; and the Schneeberg, 3481, in the Fichtelgebirge. There are several ranges in the Palatinate, of which the Harzt (2300 feet) is the principal. B. contains the stream-system of the Danube from Ulm to Passau, while the Palatinate is watered along its entire eastern boundary by the Rhine. The

length of the Danube in B. is 270 miles, all of which is navigable. It receives 38 affluents, the chief of which on the right bank are the Iller, Lech, Isar, and the Inn; and on the left the Würnitz, Altmühl, Kocher, Naab, Regen, and Ilz. The river Main rises in the N., has many affluents, and flows in a S.W. direction, joining the Rhine at Mainz. There are some fifty lakes, mostly situated among the offsets of the Noric Alps, the chief of which are the Ammer, Starnberger, Staffei, Kochel, Wacheim, Tegern, Chiem, and Waginger. Lake Constance borders B. for nine miles.

Climate, Products, &c.—Except in the valleys of the Rhine and the Main, the general climate is cold and inhospitable for Germany; but in summer again the heat in the plains and valleys is extreme. The average temperature is $47^{\circ} F.$, nearly corresponding to that of the Scottish E. coast. B. is, nevertheless, one of the most fertile countries of the empire, the S. plateau being called the German granary, on account of its productiveness. Cultivation is not in an advanced state; but besides wheat, rye, oats, and barley, the articles of produce include buckwheat, maize, rice, hops, tobacco, flax, hemp, linseed, beet-root, and liquorice. B. yields also some 9,000,000 gallons of excellent wine yearly. The forests are chiefly composed of fir and pine trees, and much of the timber is exported. Cattle-rearing and the breeding of sheep, goats, and other live stock, is one of the chief occupations. Among the minerals that are mined are salt, coal, iron, and a little gold; but in Rhenish B. a much larger variety is wrought, including copper, manganese, mercury, cobalt, quicksilver, black-lead, marble, gypsum, alabaster, lithographic-stone, and the finest porcelain-clay. There are famous mineral wells in Upper B. and in Middle Franconia.

Manufactures.—The industrial products are mainly beer, linen, cottons, woollens, leather, paper, porcelain, glass, sugar, cigars, and jewellery. Beer is by far the most important of these, yielding, it is said, nearly two-thirds of the revenue. In 1871 there were 5177 breweries, Swabia itself having 1018, producing at the rate of about 160 million gallons yearly. This beverage is universally relished; and, while it is consumed in enormous quantities within the state, it also forms one of the principal exports. The other exports are timber, wine, grain, wool, hops, glass, jewellery, scientific instruments, &c. Munich is famed for the manufacture of mathematical and optical instruments. As communication is developing, B. is profiting by the greatly increased transit trade between Italy, Switzerland, Austria, and N. Germany.

Canals, Railways, &c.—The principal canal is *Ludwig's*, which links the Danube and Rhine, and thus connects the German Ocean with the Black Sea. It was constructed by the state at a cost of over £800,000. In 1873 there were over 1100 miles of railway, 6000 of public roads, and 1500 of telegraphs. Munich is the great railway centre.

Government, Revenue, &c.—According to the fundamental state law of 26th May 1818, modified by the electoral law of 4th June 1848, B. is a constitutional monarchy, with the crown hereditary in the male line, and its domains remaining inalienable. The executive belongs to the king, and the legislature consists of two chambers—the one of senators or peers, the other of deputies. The former of these chambers is hereditary, the king, however, having a limited power of appointing senators for life; the latter is elective by various orders and classes of the community, the landed gentry, ecclesiastics, burghers, university councils, &c. By treaty of November 3, 1870, B. became an integral part of the German empire, retaining, however, among other unusual privileges, the right of conducting its own postal and telegraphic system. The estimated revenue of B. for 1874-75 was £10,602,593, and the expenditure £6,842,329. In 1873 the national debt was £39,657,360, of which £19,917,257 was for railways.

The army of B. was organised in 1871 after the Prussian system. Every citizen requires to serve, and no substitution is allowed. The term of service is twelve years, of which four years are spent in active service, three in reserve, and five in the Landwehr. The Bavarian army has an administration independent of that of the imperial army, and is under the command of the King of B. in times of peace; but in time of war is under the control of the Emperor. In 1872 it consisted of 52,029 men, of whom 32,602 were infantry, 11,562 cavalry, 5528 artillery, and 1213 'technical troops,' or engineers. On a war footing this number can be increased to 149,538 men. During the Franco-Prussian

war, the army of B. behaved with unsurpassable spirit and promptitude under the leadership of the Crown Prince of Prussia.

History.—The present *Alt Bayern*, originally peopled by the Celtic Boii, was formed under Augustus into the Roman province of Noricum. At the time of the great movement of the Teutonic races (5th and 6th c.), various tribes pressed into the land, and formed the confederated Bojoarii, who, although under chiefs of their own, were dependent on the Frankish kings of Austrasia. Foremost amongst these stood the *Agilolfinger* (first mentioned in 556), one of whom, Odilo, assumed the title of king. Thasilo II. was banished to a cloister in 777 by Charlemagne, on account of his alliance with the Avars, and in 788 Charlemagne entirely abolished the sovereign dignity in B., and appointed his brother-in-law, the Swabian Count Gerold, as governor. After the extinction of the Karoling dynasty in 911, Arnulf II., who had been Markgraf since 907, assumed the ducal dignity. Under his successors the land suffered much through internal discords, struggles with external enemies, and the perpetual change of dukes, until in 1180 the *Palatinate* (Count-Palatine) Otto von Wittelsbach, the founder of the present reigning house, received it as a grant from the Emperor. Otto, who died in 1183, as also his successor, Ludwig I., considerably increased their possessions. The latter (died 1131) received as a fief from the Emperor Friedrich II. in 1216 the *Rheinpfalz* (Rhenish Palatinate), and though this was for a time lost, it was regained at the Peace of Westphalia in 1648, as a reward of the enthusiasm and energy shown by Maximilian I. in the creation of the Catholic League. B. sided with France in the Spanish Succession War (1700), and met with great loss. On the death of the Emperor Karl VI. in 1740, Karl Albrecht, Duke of Bavaria, opposed the Pragmatic Sanction, claimed the Archduchy of Austria as against Maria Theresa, seized the country in 1741, and was chosen Emperor of Germany in 1742. He was soon after driven out of his own territories by the Austrians, restored by Friedrich II. of Prussia in 1744, and died in the year following. In the war of 1805 B. sided with France, and Napoleon rewarded the Elector (a title dating from 1777) with the dignity of king, receiving in return important military assistance in his Austrian and Russian campaigns. The territory and title thus gained was ratified by the treaties of 1814-15, the King of B. meantime having luckily abandoned the cause of France. In 1818 the new constitution was established, and in 1825 Ludwig I. became king. Enlightened and generous to extravagance, this monarch, when advanced in life, formed a scandalous connection with Lola Montez, the famous adventuress, which did much to alienate his subjects, already dissatisfied with various governmental abuses. At last the inhabitants of Munich arose, March 1848, captured the arsenal, and forced the consent of the king to the exile of Lola Montez, and to the passing of various reforms. Ludwig I. abdicated, March 20, 1848, in favour of his son Maximilian-Joseph II., who died March 10, 1864. In the same year Ludwig II. ascended the throne, and during his reign the most striking events have been the incorporation of B. with the empire, the expulsion of the Jesuits in 1873, and his stubborn opposition to an Ultramontane majority (1875). See Buchner, *Geschichte von B.* (Münch. 1820-51); Zschokke, *Sachs Bücher der Geschichte des Bair. Volks* (2d ed. Aarau, 1821); Mannert, *Geschichte B.'s* (Leips. 1826); Böttiger, *Geschichte B.'s* (Erl. 1832); Rudhart, *Älteste Geschichte B.'s* (Hamb. 1841); Siegert, *Grundlagen zur ältesten Geschichte des Bair. Volkstammes* (Münch. 1854).

Bavaria, Statue of, a statue of colossal dimensions erected at Munich by King Ludwig I. as a personification of his kingdom, and uncovered August 7, 1850. It represents a German female standing, with the Bavarian lion sitting by her side. The whole monument is 95 feet in height, the statue being 65 feet and the pedestal 30. A door at the back of the pedestal leads, by a stone staircase, into the lion, through the neck of which an iron staircase takes up to the head, in which there are two sofas, and standing-room for thirty-one persons. The head bears the following inscription:—"This colossal figure, erected by Ludwig I., King of Bavaria, was designed and modelled by L. von Schwanthaler, and cast in bronze in the years 1844 to 1845 by Ferdinand Miller."

Be-vius are small faggots of brushwood, the bush-ends being dipped in some inflammable composition, and are employed among the combustibles in fireships.

Baxter, Richard, one of the most eminent of Nonconformist divines, was born November 12, 1615, at Rowton in Shropshire, of pious but poor parents. Circumstances did not allow him to have a university education, but he went through a careful course of private study. A short visit to the court at Whitehall, followed by a serious illness, tended to deepen his naturally strong religious convictions. He was ordained at the age of twenty-three, and after being a schoolmaster, first at Wroxeter and then at Dudley, he became, in 1640, parish minister at Kidderminster, and soon earned a high reputation both as a preacher and as a moral and social reformer. B.'s eminent conscientiousness made him hold a peculiar position. After the outbreak of the civil war, although he acted as chaplain in the Parliamentary army, and held Presbyterian principles, he did not admit the unlawfulness of Episcopacy, upheld the monarchy, and was opposed to the execution of the king and the usurpation of Cromwell. On the restoration of Charles II., B. became one of the king's chaplains, but declined the bishopric of Hereford when it was offered him. On the Act of Uniformity being passed, he left the Church of England, and sided entirely with the Nonconformists. For many years he lived and wrote theological works in retirement at Acton, in Middlesex, returning to London on the passing of the Act of Indulgence in 1672. In 1685 B. was tried for writing sedition before Judge Jefferies, and, after being brutally insulted by him, was sentenced to a fine of 500 marks, or, in default, to lie in prison till it was paid. After eighteen months' imprisonment, he was released. B. lived beyond the period of the Revolution, and died 8th December 1691. He was one of the most voluminous theologians and ecclesiastical pamphleteers of his own or any other time, having produced in all about 145 treatises. His theology was a compromise between Calvinism and Arminianism, and his followers are known as Baxterians. Some of his works, such as his *Saint's Rest*, have been very popular. The last complete edition was published in 1830.

Baxterians, adherents to certain theological views advocated by Richard Baxter, the two most distinguished of whom were Drs J. Watts and P. Doddridge. The three salient points, regarding which they tried to pursue a middle course between the Calvinists and the Arminians, were—(1) the atonement, general for all mankind, but special for the elect; (2) the rejection of the doctrine of reprobation; (3) the possibility of saints falling away from saving grace.

Bay, a name given to a number of trees and shrubs. For instance, *Laurus nobilis* is the laurel or victor's B., out of which the laurel crown of the ancients was made; the name *B.*, originally only applied to the fruit, is now used for the whole plant. The cherry or B. laurel, so common in our shrubberies, is *Prunus Laurocerasus*. The red B. of the Southern United States is *Laurus Carolinensis*. The white B. of America is *Magnolia glauca*, while the Loblooly B. of the same country is *Gordonia Lasianthus*. The Indian or royal B. is *Laurus Indica*, while the rose B. is *Epilobium angustifolium*, a plant of an entirely different order. See LAUREL, GORDONIA, EPILOBIUM. B. leaves have been from the earliest times, and among widely different nations, associated with victory and rejoicing; or, as in this country, believed to be an antidote against the effects of thunder.

Bay, an inlet of the sea around which the land forms a bend, and the opening to which is wider than its depth. A gulf is supposed to be deeper, but Baffin's B., Hudson's B., and the B. of Biscay show with how little precision the word is used.

Bayaderes (Fr. from *Portu. bailadara*, a dancing-girl) denote exclusively that very numerous class of women in India who follow the business of dancers and singers. These women have different denominations in their different countries. They are divided into two great classes, each of which has several subdivisions. The first great class, that of the *Devadassi*, or servants of the gods, is consecrated to the service of the temples and of the priests; the second, that of the *Nautchis*, comprises the B. who are not attached to a temple, and who travel the country in the exercise of their profession as singers and dancers. Among the Devadassis, those of the first rank are recruited from the Vaisya caste. They dwell in the enclosure of the temple, and may not go outside of it without the permission of the chief priest. Within the temple they prepare the garlands of flowers to adorn the effigies of the gods, they dance before the sacred statues, celebrate the praises of the gods in song, and form the

principal ornamental figure of the processions and religious ceremonies. Those of the second rank of the Devadassies are recruited from the families of the Sudra or labouring caste. Their functions are almost the same as those of the first class, but they are not obliged to dwell within the precincts of the temple, in which they take their turn of service. They are allowed to visit the houses of persons who employ and pay them for dancing and singing. They are engaged for fête-days, festivals, marriages, &c., by the rich Hindus. Female children enter the order of Devadassies shortly after the period of infancy, and physical beauty and faultless symmetry are the conditions of their admission. From the day on which they are admitted, they cease to belong to their families, who, by formal contract, renounce all right to them. The Nautchies travel the country in bands. Like the Devadassies of the second rank, they are employed on festive occasions; they dance at the places of entertainment for travellers. Some associate themselves with musicians, with whom they share their profits. Others are under the direction of a leading dancer, who provides for them and receives the profits of their labours. Others are simply slaves, bought very young by the women who train them to their business, with a view of making a profit of them. The dance of the B. is not so much a dance proper as a pantomime.

Bayamo, or **San Salvador**, a town in the E. of Cuba, near the left bank of the Cauto, 20 miles E. of its entrance into the sea, and 65 N.W. of Santiago. It has an unhealthy situation, but carries on considerable trade. Pop. 7500.

Bayard, or rather **Bayart**, **Pierre du Terrail, Seigneur de**, the *Chevalier sans peur et sans reproche*, called also by his companions 'Piquet,' was born in 1476 at his father's chateau near Grenoble in Dauphiné. Under the care of Carlo I., Duke of Savoy, and then of the Count de Ligny, B. rapidly rose into favour with Charles VIII. of France, whom he served faithfully at Fornova and Novara in the campaign of 1494-95 against the Italian League. In 1503 Louis XII. sent him with D'Aubigné to Naples, where he long resisted the Spanish occupation. In 1507 he suppressed the rebellion of Paul de Novi at Genoa; and in the campaigns of the Cambrai League against the Venetian General Petigiano, at Aignadel, the siege of Padua, and the occupation of Verona, he is the foremost figure. In 1510 his brilliant actions before La Bastia decided the campaign of Pope Julius II. against Alfonso of Ferrara. He was the hero of the storming of Brescia against the Venetians, fought under Nemours at Ravenna (1512) when the Spanish general Don Pedro was taken prisoner; and greatly distinguished himself at the Battle of the Spurs near Terrouenne (1513). B. also enjoyed the confidence of Francis I. who, after the battle of Marignano (1515), asked the honour of knighthood at the hand of his subject. B.'s defence of Mézières against the Imperialists (1522), his taking of Lodi from the Duke of Mantua (1523), and frequent campaigns in the Milanese territory, fill up the rest of his life. He was killed 30th April 1524, and was buried in the church of the Minims near Grenoble. B. was remarkable for chivalrous courage, military skill (especially in skirmishing), generosity towards his fellow-soldiers, the vanquished, and the poor, purity of life, and devotion to France. His story is told in *La tres joyeuse plaisante Histoire*, by 'le loyal serviteur,' published at Paris 1527, and rendered into English by Southey, Walford, &c. See *De Terre Basse, Histoire de Pierre Terrail, Seigneur de Bayard; suivie de Recherches genealogiques, Pices et Lettres inédites* (Par. 1826, 3d ed. Lyons, 1832).

Bayazid', a fortified town in the vilayet of Erzeroum, Turkish Armenia, 15 miles S.W. of Mount Ararat, and 230 miles W.S.W. of Trebizond. It was the scene of a Russian victory over the Turks during the Crimean War, August 1854. B. was formerly a flourishing centre of trade, but has greatly declined. Pop. 5000, chiefly Kurds.

Bayazid. See **BAJAZET**.

Bayberry. See **CANDLEBERRY**.

Bayr, **Johann**, a German cartographer, celebrated for his star-charts, was born at Rhain in Bavaria in 1572, and died at Augsburg, 7th March 1625. In his great work, *Uranometria* (Augsb. 1603; Ulm, 1607 and 1633), which contained fifty-one maps, B. introduced the now universal method of naming the stars in a constellation by the Greek letters. A second work of

B.'s is his *Explicatio Characterum aneis Tabulis Insculptorum* (Augsb. 1654).

Bayeux, an old episcopal town of France, department of Calvados, on the Aure, 6 miles from its mouth, and 17 miles N.N.W. of Caen. Pop. (1872) 7716. Its splendid cathedral, of mixed Gothic and Norman, begun in the 12th c. and completed in 1497, was destroyed by lightning in 1676, but was rebuilt in 1715. In the Hôtel de Ville, the famous B. tapestry is preserved. B. has manufactures of porcelain, linen, calicoes, serges, leather, and hats, but is particularly famous for its lace. The town takes its name from the ancient *Bajucassi*.

Bayeux Tapestry, a curious piece of needlework, a relic of the middle ages, preserved in the Hôtel de Ville at Bayeux, in Normandy. It is composed of a roll of canvas or linen cloth, about 220 feet long and 20 inches wide, on which is embroidered, in woollen thread of eight different colours, a pictorial representation of the history of the Norman Conquest of England. Although its great age is undoubted, where and by whom it was executed form matter of speculation. It is traditionally reported to be the work of Matilda, wife of William the Conqueror, assisted by her maids, and that she presented it to Odo, Bishop of Bayeux, in recognition of his services at the invasion. In length, however, it exactly corresponds to two sides of the nave of the present Bayeux Cathedral which was built early in the 12th c., and this circumstance renders it probable that the tapestry belongs to a subsequent period. Indeed, some critics contend that it is English work of the 12th c., executed, probably in London, to the order of three Bayeux knights who figure frequently in the tapestry, and who shared in the apportionment of English land. The entire web embraces seventy-two scenes, which collectively exhibit upwards of 1500 figures of men, horses, and various other animals, buildings, ships, &c. Each particular event is portrayed in a distinct compartment bearing a Latin explanation, and the whole design illustrates in a graphic manner the history of the Conquest from Harold's interview with Edward the Confessor previous to the former setting out on his mission to Normandy, the events which transpired there, the sickness, death, and funeral procession of Edward the Confessor, on to the accession of Harold to the throne, the Norman invasion, the battle of Hastings, the death of Harold, and flight of the English, which closes this remarkable work. Although the drawing is rude, with no attempt at perspective, the B. T. has the artistic merit of preserving the resemblance of individuals and classes throughout. It affords a curious insight into the manners and customs of the Norman epoch, and it is peculiarly interesting and valuable for its costumes, warlike implements, military ensigns, regal pageantry, &c. This extraordinary piece of needlework was preserved for centuries in the cathedral at Bayeux, and exhibited at a particular season of the year to the people of the city; but French antiquaries were ignorant of its existence till about 1724, when their attention was directed by M. Lancelot to an illuminated drawing of a portion of an obscure historical embroidery, and the original work itself was found by Père Montfaucon in the keeping of the



Bayeux Tapestry—Harold on his Departure to Normandy takes leave of Edward.

canons of Bayeux Cathedral. In 1730 Père Montfaucon published a reduced engraving of the whole in his *Monuments de la Monarchie Française*, and an elaborate description of the needlework is also given by Dr Ducarel in the appendix to his *Anglo-Norman Antiquities*, published in London in 1767. The Society of Antiquaries, in 1816, despatched Mr Charles Stothard to Bayeux to copy it; and the result of his labours is given in a coloured engraving in the sixth volume of the *Vetusta Monumenta*. A full-sized coloured photograph of the tapestry may also be seen in the

South Kensington Museum in London, where too a small but valuable fragment of the original is preserved. In 1803, by the desire of Napoleon I., then First Consul, who at that time meditated an invasion of England, the B. T. was exhibited in the



Bayeux Tapestry—Harold takes Oath to William.

National Museum at Paris, and afterwards in some other French towns; it was thereafter consigned to the charge of the municipality of Bayeux, with which it has since remained. See *The Bayeux Tapestry Elucidated*, by J. C. Bruce (Lond. 1856), and *The Bayeux Tapestry Reproduced in Autotype Plates with Historic Notes*, by F. R. Fowke (Arundel Society, Lond. 1875).

Bay Islands, a small group in the Bay of Honduras, in about lat. 16° 30' N. and long. 86° W. The chief islands are Ruanan (q. v.), Bonacca, Uti, and Barburet. They belonged to Spain till 1821, became a British colony in 1852, but were ceded to Honduras, 28th November 1859.

Bayle, Pierre, a famous French critic and philosopher, was born 18th November 1647, at Carlat, in county of Foix, S. of France. His father, a Protestant minister, educated the eager and intellectual boy with great care; but even in B.'s earliest literary preferences we can see the future character of his genius. The admirer of Montaigne could not fail to be sceptical. His studies at Toulon brought him into contact with the Jesuits, who formed the teaching staff of the university, and the homage which his ardent nature paid to the zeal and talents of his masters was a temporary apostasy from the faith of his father. But he returned to Protestantism as rapidly as he had left it, and to escape the penalty of perpetual banishment, imposed on those who relapsed from Catholicism, he went to Switzerland, where he pursued at Geneva, under wide and less medieval forms, his theological and philosophical studies. Descartes supplanted the false Aristotle of the schoolmen. In 1675 he was appointed to the chair of philosophy in the Protestant College of Sedan, where he laboured with such rigour that he actually forgot to correspond with his friends. His first public appearances as an author were in harmony with the rational character of his intellect. When the Duc de Luxembourg was gravely accused by a learned tribunal (which included councillors of state) of having dealings with the devil, B., in a defence prepared for the Duc, conclusively exposed the absurdity of the charge. His next attempt to enlighten his age was a pamphlet entitled *Cogitationes rationales de Deo, Animo et Malo*, in answer to an enthusiast called Poinet; and this was followed by a third in 1682, *Pensées sur la Comète écrites à un Docteur de la Sorbonne*. Meanwhile Louis XIV., inspired by religious prejudices, had suppressed the College of Sedan in 1681, but B. found welcome and honour in the city of Erasmus. Appointed a professor of history and philosophy in Rotterdam, he was not slow to embroil himself in honourable controversy. His *Critique Générale* (1682) on Père Maimbourg's *Histoire du Calvinisme* was publicly burnt and universally read. Even Maimbourg himself valued the work, but it cost B. the friendship of a distinguished colleague, the theologian Jurieu, who had wished himself to refute the Catholic father. In 1684 B. conceived the idea of a periodical entitled *Nouvelles de la République des Lettres*, which achieved a great success, and made its editor a sort of literary dictator; but it also involved him in thorny questions, and the implacable Jurieu was vigilant in his enmity. A work of B.'s, worthy of all praise, *Commentaire Philosophique sur ces Paroles de l'Évangile: Contrains-les d'entrer*, in which the author took occasion to recommend the principle of toleration on philosophical grounds, led Jurieu to accuse him of religious indifference,

and even hostility to Protestantism. Additional calumnies of an odious character were cleverly exposed in his *Cabale chimérique*; but it is always easy for ecclesiastical bigotry to secure a triumph, and in 1693 B. was deprived of his license to teach. But B. was a student of few wants, and he at once turned, with the fine fervour of a literary enthusiast, to the execution of his long-meditated *Dictionnaire historique et critique*. The first edition was published at Rotterdam in 1696, and the second in 1702. It was attacked by Jurieu, by the consistory of the Walloon Church, and by other theologians, for its articles *David*, *Pyrrhonisme*, *Manichéens*, &c. The *Dictionnaire* was followed by his *Réponse aux Questions d'un Provincial*, and other controversial works. These had the effect of raising around the head of their author a final storm of theological controversy, under which his health gave way. He died 28th December 1706. The earnest conviction which B. mainly sought to impress upon his contemporaries was, that morality does not depend on religious dogma, and that good men and bad are to be found alike in Catholic and in Protestant churches. The result of this creed may have been to lead B. to a culpable indifference to all dogma—Protestant as well as Catholic; but it was necessary to the evolution of the great doctrine of toleration, which established itself in France and England during the course of the century. The force of his thoughts ran in a destructive rather than in a constructive course. We do not find from his works evidence of his having a religious or philosophical system, or of his having any fundamental belief on which a system could be built. 'My talent,' he said, 'is to form doubts, but they are only doubts.' But this fact, though it proves him to have been a thinker only of the second order, does not detract from the value of his work historically considered. And above all, his life and literature alike reveal him as, in the highest sense of the word, an *honest* man. The best editions of the *Dictionnaire* are those of Bâle (1740) and Amsterdam (1740). An extremely interesting one is that by Beuchot (Par. 1820 et seq.). See Maizeaux, *Vie de P. B.* (Amst. 1712); and Feuerbach, *P. B., seine Verdienste für die Geschichte der Philosophie* (Amst. 1838).

Baylen, a Spanish town, province of Jaen, 56 miles N. of Granada, situated in a mountain pass, where the Spaniards won their sole victory in the Peninsular War, July 23, 1808. Some 20,000 men under General Dupont here surrendered, and were sent to the hulks at Cadiz, although permission to return to France had been previously promised them. B. has manufactures of linen, tiles, glass, and soap. Pop. 7831.

Bay of Islands, an inlet on the N.E. coast of the N. Island of New Zealand, situated in S. lat. 35° 13', and E. long. 174° 11'. On it are the settlements of Kororarika and Russell. The former was the first place in New Zealand settled in by Europeans. Russell is a great rendezvous for whalers, and from it is exported the coal from the Kawakawa mines, which is largely used in Auckland (q. v.). The B. of I. forms a magnificent harbour. It is the most southerly limit of the S.E. trade-wind on the New Zealand coast.

Bayonet, a side-arm carried by infantry, and adapted for fixing to the muzzle of small-arms. It is popularly believed that the B. was invented at Bayonne about 1640, but at that time it was in general use among European armies, having replaced the pike in some instances, and so early as 1570 it was known in France. In the oldest form of B., the blade had a wooden handle which was inserted into the muzzle of the arquebus, but it was discarded for the socket-and-collar pattern, the existing form, which admits of shooting with the B. fixed. Mackay, a Scottish general of the 17th c., has been credited with the invention of the latter weapon; an example of it, however, belonging to the end of the 16th c., is now in the Culmann Collection at Hanover. The British pattern B. of the present day is of steel, 17 inches long in the blade, which has three fluted sides. The adoption of an arm which is at once a sword, saw, and B. has been suggested for the Martini-Henry rifle.

Bayonne, a fortified town of the first-class in the department of Basses Pyrénées, France, at the junction of the Adour and Nive, near their entrance into the Bay of Biscay. It consists of Great and Little B. and of the suburb Pont St Esprit, separated by the two rivers, and exports ship-timber, tar, cork, chocolate, and the celebrated hams; but the bar at the mouth of the Adour greatly hinders trade. The chief manufactures are glass, sugar,

Hqueurs, and ropes, and there are also large shipyards and distilleries. B. is the see of a bishop, with a cathedral and schools of navigation and commerce. Pop. (1872) 17,977. B., the *Lapurdum* of the Romans, was a fortress and a place of trade as early as the 3d c., the seat of a bishop in the 4th, and after the 10th c. shared the fortunes of Gascony. In 1565 Catherine de Medici here met the Duke of Alva, and arranged measures for the destruction of Protestantism. Charles IV. of Spain abdicated (1808) at B. in favour of Napoleon. The British with great loss forced the passage of the Nive, and in 1814 invested B., from which (April 14) the French made a desperate but unsuccessful sally. The convention of B., between the Duchy of Warsaw and France, was signed May 10, 1808. The inhabitants of the district are of Basque origin.

Bay Rum, a spirit prepared in the West Indies from the berries of *Eugenia acris*, used for toilet purposes and as a liniment in rheumatic affections.

Bay Window, or **Bow Window**, a window forming a recess, or bay, in a room, and projecting outward from the wall in a rectangular, polygonal, or—in debased Gothic—semicircular shape. The B. W. is peculiar to Gothic architecture.

Ba'za (the *Basti* of the Romans, and the *Bastania* of the middle ages), a town of Spain, province of Granada, in a rich plain 53 miles E.N.E. of the town of Granada. Pop. about 11,000, chiefly agricultural. B. is famous for the excellence of its wines and the beauty of its women. On the 10th of August 1810, the French under Soult here gained a victory over the Spaniards. Under the Moors it was a large and flourishing town, with 50,000 inhabitants.

Bazaar (from an Arabic word denoting traffic or merchandise), a market-place, open or covered, where merchants in Eastern countries have their warehouses and meet to transact business. The term is now frequently applied in the West to places opened for the sale of fancy goods.

Bazaine, François Achille, a French general not likely to be soon forgotten by his countrymen, was born 13th February 1811. Joining the army in 1831, he served in Africa in 1832. In 1837, having obtained a lieutenancy and the cross of the Legion of Honour, he was engaged in the Carlists and Christians war, and in 1839 distinguished himself in Algiers. In the Crimea he commanded a brigade of infantry. Appointed a General of Division, he joined the Mexican expedition in 1862, succeeded Forey in chief command, defeated President Juarez, and, in spite of crippled resources, maintained his army till 1867, when he effected a retreat by Vera Cruz. He had in 1864 been named Marshal of France, and was now placed at the head of the Third Army Corps and of the Imperial Guard. In the Franco-Prussian war, B., on the surrender of the Emperor Napoleon at Sedan, occupied Metz, where, after a seven-weeks' siege by Prince Frederick Charles of Prussia, he capitulated with an army of 175,000 men. For this act he was summoned in August 1871 before the Military Commission of the National Assembly sitting at Versailles. After some delays he was, on the downfall of M. Thiers, tried by court-martial, and found guilty of having negotiated with the enemy before doing all that duty and honour required, and having surrendered a fortified place and laid down his arms before the enemy in open field. He was condemned to death and degradation, a sentence commuted to 20 years' seclusion in the Isle St Marguerite, his escape from which, shortly afterwards, was probably connived at. B. has since resided in Spain.

Bazard, Amand, an ardent but mercurial French political thinker of the 19th c., was born at Paris, 19th September 1791. In 1820, along with some others, he introduced Carbonarism from Italy into France, but after a few years joined the disciples of Saint-Simon; and in 1825 became one of the editors of *Le Producteur*, a Socialist and Communist journal, which did not succeed. B., however, made a great impression on those with whom he came into contact, and in the public conferences of the sect in 1828 he was one of the most conspicuous speakers. But after the July revolution he quarrelled with a man far more subtle and powerful than himself, Père Enfantin, who soon displaced him in the leadership of the Saint-Simonians. B. died 29th July 1832, from the effects of a stroke of apoplexy, caused by the excitement of a public discussion.

Bazoche. See BASOCHÉ.

Bdellium, a gum resin, allied, as well botanically as in its physical properties, to myrrh. It is found to be produced by two species of *Balsamodendron*, *B. Roxburghi*, and *B. Mukul*, and in the E. Indies, where it is produced, it is known as Googul. This is supposed to be the B. mentioned in Scripture. It is used in the E. Indies both internally and externally as medicine; it is likewise employed in Hindoo incense, and it is much employed in the East for mixing with plaster in walls to render it more tenacious.

Beach'es, Raised, elevated tracts of land formerly B. of the sea, whether raised by earthquakes, or left high and dry by the receding ocean, is a question which has to be answered in each particular case. That they were formerly sea-B. is evident from the shells found in them peculiar to species which now are found in northern seas, the alternating sand and gravel beds, and their levelness for considerable distances, generally in the direction of the present shores. There are also produced by similar causes terraces of erosion, which supply evidence of the action of the sea on the face of rocks, in lines somewhat parallel to those at present being formed, but elevated high above them. In Scotland, round the coasts of the Highlands and Islands, such terraces are to be seen 25 feet above the lines at present being formed; in Lapland there is one declining from an elevation of 220 to 85 feet in a course of 30 miles; in Norway, behind Drontheim, there is one at the great height of 520 feet above the present level of the sea.

Beach'y Head (a corruption of the Fr. *beau-chef*, 'beautiful headland'), a lofty promontory on the S. coast of England, in Sussex, formed of chalk cliffs, rising 564 feet above the sea-level. In 1828 the Bell Tont Lighthouse was built here, with an elevation of 285 feet. Its light is visible 22 miles off. Caverns have been cut in the cliffs as places of refuge for shipwrecked mariners.

Beacon (Old Eng. *bedcen*, a sign), a fire-signal set on an eminence as a warning of impending danger. Such signals have been used by almost all nations; their antiquity is shown by the frequent allusions in ancient classical writings to the employment of fire-beacons during war; and in Jeremiah vi. 1, mention is made of a 'sign of fire,' betokening approaching disaster. During the reign of Edward III. pitch-boxes were lighted as beacons, and the expense of watching and maintaining them was defrayed out of the Exchequer. At the death of Henry VIII., when England decided to prosecute the war with Scotland, the Scottish court ordered beacons to be lit on all the hills near the E. coast as a warning of the approach of the enemy's fleet; and when the 'Invincible Armada' threatened descent on our shores, beacons were placed along the coast from Land's End to Lindisfarne to enjoin the people to watch and pray for succour and safety. Fire-pots and B.-grates are yet to be seen in many parts of the United Kingdom, and they are generally turned to account on occasions of rejoicing.

Beacon, Maritime, a mark for the guidance of mariners placed on projecting headlands, tidal rocks, banks or shoals at an estuary or river mouth, or entrance to a harbour. Beacons are usually of a conical form, constructed of stone, wood, or cast-iron plates, or, in exposed situations, of an open framework of cast-iron pipes, and are erected in places where it is not expedient to establish lighthouses. As beacons generally exhibit no light, and therefore are useful only by day and in clear weather, buoys or floating sea-marks, though less permanent, serve much the same purpose. Suggestions have been thrown out at various times for lighting beacons; and Mr Thomas Stevenson has introduced with success a method of indicating the position of beacons by transmitting from the shore a beam of light which is dispersed by means of reflecting apparatus on the top of the beacon. Mr Stevenson has also proposed to light beacons by electricity; and, in 1870, Mr Fleeming Jenkin patented a method of lighting beacons and buoys, by producing a rapid succession of electric sparks by alternate charges and discharges of a condenser placed on the beacon or buoy, communication with the shore being maintained by means of submarine wires.

Bead, also in the earliest English, *Gebéd* (comp. Ger. *Gebet*), signifies a prayer, and retained this meaning down to the close of the 16th c. As late as the age of Spenser we find it so used (*Faery Queen*, b. 1, c. 1, st. 30): '*Blidding his beades all day for his trespass*,'—the explanation of which is given in the glossary published with the *Shepherd's Calendar* by the same author—

'Te bidde is to pray, whereof cometh beades for prayers, and so they say "to bidde his beades," sc. to say his prayers.' But at a very early date the word had come to denote also the roll of little balls made of gold, silver, ivory, glass, wood, &c., by means of which an account was kept of the number of prayers repeated. In Chaucer (*Prolog. Cant. Tales*, l. 159) we have a *peire of bedes gaudid al with grene*; and in the *Romaunt of the Rose* (7372) both uses together—

'A peire of bedis eke she bere
Upon a lace, alle of white threde,
On which that she her bedes bede.'

One who prayed for another was called a *bedesman*. The name did not at first necessarily denote a pauper hired to pray for the rich, by whose alms he was maintained. It was applied to any pious recluse or hermit whose life was devoted to prayer, and who might receive, though he would not ask, support from those who lived near him; but gradually it came to denote mere dependents on the bounty of others, and the primary idea of prayer totally disappeared. Edie Ochiltree in the *Antiquary* was a king's *bedesman*, but it may be doubted if the pawkie gaberlunzie was often on his knees for the safety of King George's soul.

Bead, in architecture, a small round moulding, seen chiefly in Grecian and Roman architecture. It is sometimes cut into embossments, resembling beads on a necklace, and is much used in wood-carving. It is often called an astragal.

Bead, a small ornament, usually globular in shape, of glass, porcelain, or other material, and perforated so that numbers can be strung together into a necklace, or fastened with thread to the surface of any textile fabric. In the form of beads traces of the most ancient glass manufacture are found in ancient Egyptian tombs, and glass beads yet continue to be made in enormous quantities. Venice has long been the principal seat of the manufacture of fancy glass beads, and there artistic combinations of the various colours and qualities of glass characteristic of Venice are employed in bead-making. Imitations of pearls, precious stones, and metals are also made in glass for beads, the chief seat of this manufacture being in Paris. Large quantities of plain beads are made in Birmingham, which are used for embroidery and fancy work. Beads are universally prized among all savage tribes, and they form the readiest and most convenient medium of exchange in commercial transactions with such races. Beads of more valuable materials are much worn in civilised countries as necklaces. In Westphalia amber beads are much used for necklaces, and red coral is generally esteemed for like purposes. Ornamental fruits and seeds are also frequently bored for use as Necklaces and Rosaries (q. v.).

Bea'dle (Old Eng. *byddel*, a crier or summoner, from *bidan*, to command or summon), is an officer frequently attached to the church in England. He is appointed by the vestry. His business is to give notice when a vestry meeting is appointed; to attend upon it when met; and to execute its orders. He is also to assist the churchwardens, overseers, and constables in their respective duties, and to make himself generally useful in vestry and parish business.

Beagle (Gael. *beag*, 'small'), a variety of dog, of comparatively small stature, and formerly much employed in hunting hares. It is 10 or 11 in. high at the shoulder, but the favourite specimens were of less height. These dogs are of an enduring, patient disposition; their scent is keen; and their cry may be described as pleasant or musical in tone. The ears are long. The colour is dark-brown, with white on the fore-paws; or the body-colour may be white

with red markings. The hair is short. The Harrier (q. v.) has almost entirely superseded the B. in sport.



Beagle.

Beak. See BILL.

Beak'd, in heraldry, means that the beak of a fowl is of a tincture different from that of the body. 'B. and membered' signifies that the legs are of the same tincture as the beak. B. does not apply to birds of prey.

Beaker, a large cup or drinking-bowl, originally of *beech*-wood, hence the name. The word does not occur in the oldest English, but the analogous *becher* of the Germans suggests its derivation. The form in Lowland Sc. is *bicker*, which is still restricted in its application to a wooden cup or bowl.

Beam (same as Ger. *baum*, Dut. *boom*, a tree, hence timber), in mechanics, denotes any piece supported at one or more points, and loaded at others, in such a way as to be subjected to a cross-breaking stress.—B. of a ship, a word used by ship-builders, meaning the *breadth* of a vessel measured amidships.

Beaming, the operation of winding weft-yarn on a beam, called the yarn-beam, preparatory to weaving. The loom contains two beams—the one which holds the unwoven weft-yarn, and the other, which receives the cloth as it is woven.

Bean, a term applied to the seeds of many plants of the sub-order *Papilionaceæ* of the *Leguminosæ* (q. v.). The common B. (*Faba vulgaris*) has been cultivated in Europe and Asia from a remote period. It is perhaps a native of the borders of the Caspian. It is very nutritious, containing about 36 per cent. of starch, and 23 per cent. of legumine. The varieties most famous for garden cultivation are—the Windsor B., long pod, and early Mazagan. The roots of the B. are diuretic. The plant is apt to be injured by the Collier aphid, or black dolphin-fly (*Aphis fabæ*), which destroys the leaves. The best remedy is to cut off the tops, which are usually first attacked, as soon as the fly makes its appearance. Kidney-beans, scarlet-runners, and haricots (all belonging to the genus *Phaseolus*), lentils (*Ervum*), &c., though sometimes called beans, are entirely different from the above.

The variety of B. cultivated is the common tick or field B., closely resembling the *horse* or *Scotch B.* In England, an average soil will yield from 20 to 40 bushels per acre, but in some of the good soils of Fife and the Lothians 60 bushels per acre, each bushel averaging 66 lbs., will be obtained. It is now little used as an article of food, though at one time generally employed for making meal, out of which a coarse but nutritious bread was baked. It is an excellent feeding material for horses. Farmyard manure is the best, and indeed the almost essential one to be applied in the growth of beans.

Bean, Calabar. See CALABAR-BEAN and PHYSOSTIGMA.

Bean Caper. See ZYGOPHYLLACEÆ.

Bean Goose. See GOOSE.

Bean-King's Festival, a relic of the Roman Saturnalia, of electing a mock-king by lot, which has lingered in some countries; the use of the bean being also a relic of the superstitious veneration paid to beans from the belief that they contained the souls of the dead. On Twelfth Night there is distributed to each of the company a piece of a cake into which a bean (and sometimes a pea for a queen) has been baked, and whoever gets the bean in his piece is made controller of the festivities for the night.

Bean, St Ignatius. See STRYCHNOS.

Bear, a genus of *Carnivorous* mammals belonging to the *Plantigrade* section of that order—that is, to the section characterised by the fact that the whole sole of the foot is applied to the ground in walking. The bears form the types of the family *Uridæ*. These animals are less typically of *carnivorous* habits than their congeners of the order; many of the bears feeding on fruits and vegetable matter, on honey, &c. The molar or grinding teeth are tuberculate, the *carnassial* or flesh-molar possessing a tuberculate crown instead of a sharp trenchant edge, as in other and typical canivora. The dental formula of the bears shows six incisors, two canines, eight præmolars in each jaw; four true molars existing in the upper, and six in the lower jaw—making a total of forty-two teeth in all. The foremost præmolars generally fall out as the animal advances in age. The feet are provided with five toes each, and the soles are generally destitute of hairs, although the Polar bears possess hairy soles. The front-limbs are generally shorter than the hind-limbs, and are very muscular and mobile, a conformation of great service to these animals in climbing. The toes are armed with strong claws, which

are non-retractile, and which are used in digging and burrowing. The tongue is smooth and fleshy. The intestine is destitute of a cæcum. The ears are of small size, rounded and erect. The tail is short and rudimentary. The nose is prolonged slightly to form a truncated mobile snout. The pupil of the eye is of circular form. The body is covered by a thick, close-set fur, consisting of shaggy hair. The gait is generally lumbering and clumsy; and most of these animals hibernate during the colder seasons of the



Polar Bear.

year. In their distribution, the bears occur in every quarter of the world—Australia, however, proving in this, as in the case of other and higher mammals generally, an exception to this statement. The African continent is also somewhat exceptional, in that bears exist only towards the northern portions, and these in limited numbers.

The European or common brown B. (*Ursus Arctos*) is a familiar species. This form occurs in the forests of Europe from the N. to the Pyrenees and Apennines, and in Northern Asia. In recent geological times this form existed in Britain, and had a much wider European distribution than at present. Its food consists of roots, fruits, worms, insects, honey, and more rarely of flesh. Its average length is four feet, and its height about two and a half feet. This species is hunted for the skin, fat, and tongue. It may be tamed in a very complete fashion, and is by no means fierce or quarrelsome unless irritated. The black B. of America (*U. Americanus*) is a nearly-related form, and is found throughout N. America. The fur is of a glossy black colour, and it is chiefly hunted for the sake of its skin. Varieties of this species with lighter skins exist. In winter, the black B. approaches human habitations, and may then carry off domestic animals. The American grizzly B. (*U. ferus*) is a much more formidable species, inhabiting mountainous regions such as the Rocky Mountains and the eastern plains to 61° N. lat. It averages eight feet in length, and is of a ferocious disposition, although it generally subsists on roots and acorns. In other cases the grizzly B. may not only kill the large Bison of America, but drag away the carcass with ease. All the foregoing species hibernate in winter. The Arctic or Polar B. (*Thalassarctos maritimus*) is found exclusively in the Arctic regions. Its fur is of a white colour; the hair-clad soles of the feet giving this form a sure hold upon the ice. The paws are very long, and the neck is also elongated. It swims well, and feeds upon dead whales, seals, &c., but is also an expert fisher. The Syrian B. (*U. Syriacus*) found in Mount Lebanon is probably the biblical B. It is of a light-brown colour, the fur between the shoulders being long and mane-like. The sloth or jungle B. of India (*Prochilus labiatus*) is distinguished by the protrusion or elongation of the lips. This B. is frequently tamed by jugglers. The Malayan sun-B. (*Helarctos Malayanus*) of Sumatra and Borneo, and its variety of Borneo (*H. euryspilus*), possess smooth glossy hair, and feed on fruits and honey. They are much less fierce than the other members of the family, and are very playful when tamed. The cave-B. (*U. spelæus*), the fossil remains of which occur in Britain and elsewhere, in Tertiary deposits, is an extinct form which was of larger size than the Polar B. It apparently survived the human epoch.

Bear. See EXCHANGE.

Bear, Bere, or Beer. See BARLEY.

Bear-Baiting. The provoking and harassing of a bear by dogs used to be regarded as sport in various Christian countries. Although, like bull-baiting and badger-baiting, it has long been

discontinued in England, it used to be one of the entertainments passionately frequented by all classes—royalty witnessing the cruelty with as deep delight as the rabble.

Bearberry. See ARCTOSTAPHYLOS.

Bear, Great and Little. See URSA MAJOR and URSA MINOR.

Bear Lake, Great, the most northerly of the large lakes in the centre of British America, lat. 65° to 67° N., and long. 117° to 123° W. Its form is irregular, and its surface is estimated to be 14,000 sq. miles in extent, and 230 feet above the sea. A river of its own name drains it into the Mackenzie river.

Bear-Pit, a circular pit in zoological gardens, about 25 feet in diameter and 20 feet in depth, with vaults around it for the bears to retire to. A thick pole with cross-spars rises from the centre of the pit, on which the bears are fond of climbing, and where they catch many various morsels of food from visitors.

Bear's Grease. The solid fat of the white bear at one time possessed an enormous reputation as an application for the human hair, and B. G. was in great demand. A factitious compound of hog's lard very frequently was substituted for the genuine article, and that fact may account for the decreased popularity of B. G. as a preventive from baldness.

Beard, the hair upon the chin, cheeks, and upper lip, which in the human family appears at the age of puberty as a distinctive mark of the male sex. It is usually rather lighter in colour than the hair of the head, and as a general rule its character depends upon the nature of the climate. In hot and dry countries, it is invariably dark, dry, and long; and, on the other hand, thick, curly, and fair in cold and damp countries. The hair, being a bad conductor of heat, protects the face and throat from cold, and acts as a safeguard against excessive heat. The B., particularly the mustache, or hair of the upper lip, is of great utility in preventing dust of any kind being inhaled with the breath, particularly so to masons, bakers, glass-engravers, and workers in metals, who in their avocations are constantly exposed to an atmosphere charged with minute particles of the materials operated upon. Among some nations the B. grows in great profusion, and among others very stintedly; with the former it is generally regarded as a graceful ornament, while some of the latter thoroughly eradicate it. In Old Testament times great respect was paid to the B., and special attention was given to it. Among the upper classes it was perfumed, anointed with oil, and occasionally dyed. An uncouth and dishevelled B., or its entire removal, denoted a state of mourning or deep sorrow, and no greater insult could be offered than spitting on or pulling one's B. Slaves in ancient times were deprived of their beards, and with the Turks even now a state of servitude among the attendants of the seraglio is indicated by a shaven face. The Turkish husband and father is accustomed to have his B. kissed by his wives and children as a mark of affection. The intense love of cleanliness on the part of the Egyptians would not suffer them to wear a B., save, according to Herodotus, in times of mourning. Though a shaving people, they had a singular custom of wearing upon the chin a false B. of plaited hair, which differed in shape according to the rank and position of the wearer. Kings wore long and square-bottomed beards, those of private individuals were very short, and gods were distinguished by their long beards curling up at the end.

Among the early Greeks a thick B. was considered a mark of manliness, and the Greek philosophers thought that a certain dignity of character attached to its long growth. Shaving was introduced into Greece by Alexander the Great, who ordered his soldiers to perform that operation, and the practice continued general till the time of Justinian. About A.C. 300, Ticinius Menas is said to have introduced to the Romans a Sicilian barber who inaugurated shaving, and Pliny states that Scipio Africanus was the first Roman who shaved daily. Later on, the festival which celebrated the assumption of the *toga virilis* by a young Roman was made the occasion of the first operation of shaving, and the hair then cut off was consecrated to some deity. The Bayeux tapestry shows that mustaches were worn by the English soldiers prior to the invasion of the Normans, who shaved not only the entire face, but the back of the head likewise. This Norman custom caused Harold's spies to report that the invaders were all priests. Louis XIII., of France, not being endowed

by nature with a B., his courtiers revived the fashion of shaving, and soon after partial shaving, and trimming the mustaches and B. to an ornamental form, became general over Europe. In the 16th c. the English clergy were noted for their beards of great length. In the beginning of the 18th c. the face was wholly shaven, and continued so till early in the present century, when the French led the van in again wearing the B. During the reign of Czar Peter the Great, a tax was imposed upon beards, and collected at the gates of every town. Of late years the British soldiers and sailors have been allowed, within certain limits, to cultivate beards, and by the removal of what was an unjust restriction, the great extremes of temperature to which the men are exposed may be endured with comparative impunity.

Beard'ie, the Scotch name for the fresh-water fish belonging to the family *Cyprinidae*, and known as the Loach (q. v.) (*Cobitis*).

Beard Moss. See USNIA.

Bearing is a nautical term much in use. It denotes chiefly the direction in which a ship is sailing with reference to the points of the compass. But objects seen from the ship also are said to have their B. *ahead*, *astern*, *port* (*larboard*) *quarter*, *starboard bow*, as the case may be. Sailors also speak of B. *off*, *in*, *away*, *up*, &c.

Bearing the Bell, a phrase denoting excellence in any art or pursuit. The person who carries off the prize in a contest is said to *bear the bell* away from his competitors. The phrase dates from the beginning of the 17th c., when it was customary to gift the winner of a horse-race with a small bell of gold or silver.

Béarn' (Lat. *Benearnia*), a former province in the S.W. of France, now included in the present department of Basses-Pyrénées (q. v.). It originally formed part of the Roman Aquitania. In the time of Ludwig the Pious, son of Charlemagne, Centullus, a scion of the ducal house of Gascony, obtained the county or viscounty of B. One of this family, Gaston IV. (1088-1130), was a distinguished warrior in the first Crusade. In the 14th c., B. passed by marriage to the Counts of Foix. Subsequently the land, along with Foix and Navarre, belonged successively to the houses of Foix, Grailly, and Albret. Jeanne d'Albret, the heiress of the lands, married Antoine de Bourbon in 1548. Their son Henri, surnamed the *Bearnois*, ascended the throne of France as Henri IV. in 1593, but B. was first made a French crown-land by Louis XIII. in 1620. Its capital was Pau. The modern inhabitants of B., descended from the old *Benarni*, are the finest of the Gascons. Their proper language is Basque, but since the French revolution French has been displacing it.

Be'as (anc. *Hyphasis*), a tributary of the Sutlej, and one of the rivers from which the *Funjab* ('land of five rivers') was named. It rises in the Ritanka Pass of the Himalaya, 13,200 feet above the sea, and joins the Sutlej 50 miles S.W. of Lahore, after a course of 220 miles.

Beat, in music, has two meanings: (1) a musical ornament resembling a short shake; and (2) a subdivision of a bar or measure. B. has also a third meaning, belonging more properly to acoustics. When two simple musical tones, differing slightly in pitch, are sounded together, the sound heard varies regularly in loudness. Each recurrence of maximum loudness is called a B., and it is these beats which are the physical cause of the sensation we call *discord*.

Beat of Drum, in military language, is a signal, order, or instruction given by a particular kind of beat. The best-known of such signals are the reveillé, the assembly, the march, the retreat, the call to arms, &c., some of which may be also given by the bugle or trumpet.

Beatification, an inferior degree of Canonisation (q. v.), by which the Pope allows religious honours to be paid to some one without pronouncing *ex cathedra*, as in canonisation, on the state of the blessed.

Beating and Wounding. The legal offences included under this title may be held to include that of Battery (q. v.); but B. and W. is rather held to express a graver offence than would be included by battery. B. and W. is in law subdivided into *assault* and *mayhem*. *Assault* is an attempt or offer to do corporal injury to another; and it is essential to the offence that

there be the intention and the power to do the injury. But that the intention failed will not be held to excuse or even palliate the offence. *Mayhem*, or, as it is more correctly written, *maimem*, is a much graver offence than the other. It consists in depriving another of the use of a member of his body, useful in defence or attack. It has accordingly been decided that the loss of an ear, the ear being valueless for either purpose, did not constitute *mayhem*. But corporal maiming is now generally held to be a crime of equal gravity to that of legal maiming. These personal injuries are crimes against the public as well as private wrongs, and consequently render the offender liable to action at the instance of the crown as well as to action at the instance of the person injured. No words, however irritating, can constitute an assault; on the other hand, they may palliate one. It has been decided that any illegal act which ultimately causes personal injury to another may constitute a ground of civil action. The essence of the offence is malicious intention or culpable carelessness.

There is a very wide range, indeed, in the criminality which the law attaches to assault. What is called an *aggravated assault* may render the criminal liable to penal servitude for life. Here again *intention* is the essence of the crime; assault, with intent to rob, murder, or commit other felony, being an indictment which, followed by conviction, carries a greatly severer penalty than an indictment without such allegation. At the same time, even though the intention be not otherwise obvious, it may be inferred from the nature of the assault itself. Thus, if it be made with a loaded pistol, knife, or other lethal weapon, intent to murder may be presumed. In Scotland the law is nearly the same as in England with regard to these offences. What is called *hamesucken* is, in Scotch law, a special aggravation of assault. It consists in assaulting any one in his own house or dwelling-place. To constitute the crime there must, however, be premeditation. To assault any one in his own house, in immediate consequence of a quarrel there, is not *hamesucken*.

Beating Judges is, in Scotch law, the title of the offence of assaulting a judge. To assault a judge on the bench is, under an old Scotch statute, a capital crime.

Beating the Bounds, is, in England, the popular expression for the ceremony by which a knowledge of the boundaries of a parish is preserved. The legal term is *Perambulation of Parishes*. It is done by the clergyman, churchwardens, and some of the parishioners going over and surveying the boundaries once a year, towards Ascension Week. The surveyors are entitled to go over any one's land which it is necessary to traverse. It is said that boys used to be whipped at special boundaries, to impress the spot on their memories. See BOUND, BOUNDARY.

Beat'on, **Betoun**, or **Bethune'**, **David**, Cardinal and Primate of Scotland, one of the most memorable of Scotch ecclesiastics, and a keen opponent of the Reformation, was a son of John B. of Balfour, in Fifeshire, and was born in 1494. Educated at Oxford and Paris, he early entered the Church, under the auspices of his uncle, James B., Archbishop of Glasgow, and was made Rector of Campsie. His career, both as an ecclesiastic and politician, was brilliant and rapid. In 1519 he was appointed by Regent Albany resident for Scotland at the French court; in 1525, Abbot of Arbroath; and in 1528, Lord Privy Seal. He was sent to France as ambassador to negotiate King James's two marriages—the first with the French king's daughter, the Princess Magdalene, who died six months after marriage; and the second with Mary, daughter of the Duke of Guise, himself solemnising the latter in St Andrew's Cathedral in 1537. We once more find him in France, in which he was appointed Bishop of Mirepoix. He was very much attached to this country, to which his family originally belonged; and, as Dr Hill Burton says in his *History of Scotland*, 'He was deep in Italian and French politics—more, indeed, of a Frenchman, and a servant of the Guises, than of a Scotsman.' This proved a great misfortune for his country, his Church, and ultimately for himself. Returning to Scotland, he became coadjutor to his uncle as Archbishop of St Andrews, and on his death, his successor, with the additional title of Primate of Scotland. Prior to this he had been made a cardinal by Pope Paul III. He now began a vigorous persecution of the Scotch reformers, carrying King James with him in this. He also persuaded his master into a war with England, which ended in the disastrous battle of Solway Moss, December 14, 1542. After the king's death, which was the result

of this defeat, he endeavoured, by means of a forged will, to become one of the regents of the kingdom; but the document was rejected by the nobility, the Earl of Arran was made regent, and B. was thrown into prison. In a somewhat suspicious manner he was released, and became reconciled with the regent, whom he induced to abandon the doctrines of the Reformation. On Queen Mary's coronation, in 1543, B. again rose into favour, and was made Chancellor. He resumed his persecution of the Protestants, and among his victims was the celebrated preacher George Wishart, who was burnt at the stake at St Andrews. A popular story that his sufferings were witnessed and gloated upon from a window by B. is now believed to be without foundation. B. had, by his persecutions, and his haughty conduct generally, made himself very unpopular; several conspiracies were formed against him, and at length he was assassinated by John and Norman Lesly in his own castle, May 29, 1546. B., in his character, resembled Mazarin, the French ecclesiastical statesman, and would probably have been both much more successful and more popular in France than in Scotland. He was an immoral as well as a cruel man, and had by his mistress, Marion Ogilby, three sons and three daughters, of whom the former were legitimated in his lifetime, while the latter were well married. He is said to have written memoirs of his embassies, but nothing that may have come from his pen has been published.

Beattie, James, a Scottish poet and philosopher, was born at Laurencekirk, Kincardineshire, October 25, 1735. He studied at Marischal College, Aberdeen, with much success; and after being for a time one of the masters in the grammar school of that town, became in 1760 Professor of Moral Philosophy in Marischal College. In 1770 he published an *Essay on Truth*, a defence of Christianity against Hume, which, although it is now admired more for the vigour of its language and the religious enthusiasm displayed in it than for the accuracy of its reasoning, made him very popular. The University of Oxford conferred on him the degree of LL.D., and he had a personal interview with George III., from whom he received a pension. He was also offered preferment in the Church of England, but declined lest his motives should be misinterpreted. In 1761 he had published a volume of original poems and translations, and during 1771-74 appeared his beautiful poem of *The Minstrel*, which established his reputation, and which is still admired by lovers of picturesque description and genuine emotion. Before his death, August 18, 1803, which seems to have been hastened by the death of his son, a young man of much promise, he produced several other works, the chief of which are *The Evidence of the Christian Religion Briefly and Plainly Stated* (1793), and *The Elements of Moral Science* (1786). See Sir William Forbes's *Life of B.*, accompanying an edition of the poet's works (2 vols. 1805).

Beaucaire (anc. *Ugernum*), a town in the department of Gard, France, on the right bank of the Rhone, about 30 miles N. of its entrance into the Mediterranean. It stands opposite the town of Tarascon, with which it communicates by means of a suspension-bridge 1354 feet long, and is a station on the railway from Tarascon by Nîmes and Montpellier to Cette. It is celebrated on account of its annual fair (held 22d to 28th July), said to have been established by Count Raymond II. of Toulouse in 1217, but first mentioned in a document of date 1315, and which formerly attracted immense numbers of merchants from the most distant parts of Europe, and even from Asia. It is still an important market for the sale of wines, oil, skins, drugs, wool, cotton, and fruits. Pop. (1872) 7604. Under the Romans, as a *castrum* and station on the great road from Nemausus (Nîmes) to Italy, B. was a place of importance, as the discovered columns, statues, mosaics, and other relics of antiquity prove. In the middle ages it was a strong fortress, and is prominent in the literature of the Troubadours. It favoured the Albigenses, and shared in their misfortunes. Also in the Huguenot wars of the 16th, and in Richelieu's wars of the 17th c. it suffered much.

Beau-champ, Alphonse de, a French author, born at Monaco in 1767, entered the Sardinian service in 1784, was imprisoned some months for refusing to serve in the war against France, and on his liberation repaired to Paris, where he was intrusted with the surveillance of the press by the Directory, a position which supplied him with materials for his *Histoire de la Vendée* (3 vols. Par. 1806). Fouché deprived him of his office

for alleged indiscreet use of documents confided to him as a minister, and in 1809 he was banished to Rheims, but was recalled in 1811, and again employed by the government on condition that he should publish nothing on contemporary politics. In 1814 he lost this place, but in 1820 he received a pension, which, on his death, June 4, 1832, was continued to his widow. B.'s literary activity was great, and he contributed largely to many journals; but the value of his historical writings is impaired by his evident party bias, from which, however, his *Histoire de la Conquête et des Révolutions du Pérou* (Par. 1808), and *Histoire du Brésil depuis sa Conquête en 1500 jusqu'en 1810* (Par. 1815), are free. The *Mémoires* printed (1824) under the name of Fouché have been ascribed to B.

Beaufort, the name of sixteen different towns and castles in France, of which the most important is **B.-en-Vallée**, a town in the department of Maine-et-Loire (Anjou), 15 miles E. of Angers, with manufactures of sailcloth, leather, &c., and a trade in grain, hemp, nuts, prunes, and wine. Pop. (1872) 2623. B. had formerly a strong castle, and gave title to the English Dukes of B. (q. v.).

B. is also the name of several places in N. America, of which the best-known are B., a port of N. Carolina, at the mouth of Newport river, in Albemarle Sound, with a pop. (1870) of 2850; and B., in S. Carolina, on the Port-Royal river. Before the outbreak of the civil war the place was prosperous, the wealthier of the S. Carolinian planters living in the neighbourhood.

The name is also given to a district in the S.E. of Cape Colony, with an area of about 13,050 sq. miles, and a pop. of 1000. It is bounded on the N. by a lofty range of mountains, and in the S. by the Great Fish River, and contains a great quantity of excellent pasture. **Fort B.** is the capital, and stands on the Kat, a branch of the Great Fish river, 110 miles N.E. of Port Elizabeth, on Algoa Bay.

Beaufort is the name of historical families in England, France, and Belgium.

1. *The English Beauforts*.—Their origin dates from the second half of the 14th c., when Katherine Swynford became the mistress of John of Gaunt, Duke of Lancaster, and third son of Edward III. The offspring of this connection, both male and female, were afterwards legitimised on the marriage of Katherine to the Duke after the death of her husband. Undoubtedly the most able was **Henry B.** (the name was taken from a castle in Anjou, where they were born), who was born about 1376, and educated in Germany. At the Council of Constance in 1417 he supported the election of Martin V. as Pope, who in return made him a cardinal. When his nephew, Henry V., wished to impose a new tax on the clergy to enable him to carry on his war with France, B. boldly opposed the measure, but privately lent his kinsman £28,000 out of his own purse. The Pope was so pleased with his zeal that he sent him as his legate to Germany to organise a crusade against the Hussites. The scheme did not succeed, and as B. employed the money he had received to assist in fitting out an English force against France, he lost the papal favour. On the death of Henry V. (1422), he became the virtual head of that great oligarchy of lords temporal and spiritual who ruled the nation and directed its policy—persecuting the Lollards at home, fighting the French abroad. In 1431 he caused the young King Henry VI. to be crowned in Paris, and later on laboured hard in the English interest to bring about a reconciliation between the Dukes of Burgundy and Bedford, but withdrew from the conduct of affairs when the English cause in France became desperate. He died at Winchester (of which see he was bishop), 14th June 1447, suspected of complicity in the murder of his chief political rival, Humphrey, Duke of Gloucester, leader of the war party. B. was the only English member in the ecclesiastical court that tried and condemned Joan of Arc. **John B.**, elder brother of the cardinal, was made Earl of Somerset by Richard II. in 1397, and Marquis of Dorset in 1398, the latter of which titles he resigned to his brother, Thomas, afterwards Duke of Exeter. He died in 1410. His son John was created Duke of Somerset by Henry V., and died in 1444, leaving an only daughter, Margaret, who married Edmund Tudor, Earl of Richmond, father of Henry VII. **Edmund B.**, Earl of Dorset and second Duke of Somerset, brother of the preceding, is notable for his inextinguishable hatred to the Duke of York, who prevented him from becoming regent of France after the death of Bedford (1435). Having, however, obtained this

office in 1445 by disgraceful intrigue, he conducted affairs so badly that soon nothing was left to the English in France save Calais and Guines; and on his return home, in 1450, the public anger against him was so great that for a short time it was necessary to keep him prisoner in the Tower. On obtaining his liberty he soon reacquired favour and influence at court, and worked with malignant zeal against his old rival. Once more thrown into the Tower (1454), he was again pardoned, and appointed governor of Calais and Guines; but was slain at the battle of St Albans in 1455, in the beginning of the 'Wars of the Roses.' His three sons—Henry, Edmund, and John—vainly sought to revenge their father's death. The first two were executed (respectively 1463, 1471) by command of Edward IV.; the third died childless, and with him expired the lawful line of the Dukes of Somerset belonging to the house of B. But a natural son of Henry, the eldest of the three, viz., Charles, was made Earl of Worcester in 1514, and one of his successors, Henry, fifth Earl of Worcester, was raised to the rank of marquis in 1642, while his grandson, Henry, was made Duke of B. by Charles II. in 1682. From this last are descended the modern English Dukes of B., whose present representative is **Henry Charles Fitzroy Somerset**, eighth Duke of B., born 1st February 1824, succeeded to the title on the death of his father in 1853.

2. *The French Beaufoirts.*—These take their origin from the mistress of Henri IV., Gabrielle d'Estrées, who raised into a duchy the little town of B., in Champagne, which belonged to her family. By far the most noted of this line is François de Vendôme (q. v.), Duc de B., the grandson of Gabrielle and Henri.

3. *The Belgian Beaufoirts.*—The Comtes and Ducs of B. who belong to Belgium take their title from a castle in Namur. Their origin goes back to the dawn of the middle ages, and as early as the 13th c. the house had divided into four branches—B. de Gones, B. de Fallais, B. de Celles, and B. de Spontin, the last of which in particular produced some eminent men, of whom we can only mention **Frédéric August Alexandre, Duc de B.**, who was appointed governor-general of Belgium by the Allies in 1814.

Beaugency, a town of France, department of Loiret, on the right bank of the Loire, 16 miles S.W. of Orleans; pop. (1872) 3882. B., once strongly fortified, occupied a prominent place in the civil and military history of France, especially in that of the religious wars of the 16th c., and still preserves its feudal appearance. It has manufactures of woollens, leather, sugar, and brands, and a trade in corn, wood, and wine.

Beauharnais, Alexandre, Vicomte de, a member of an ancient French family, was born in 1760, in the island of Martinique. He served under Marshal Rochambeau in the American War of Independence, proceeded subsequently to Paris, where, although his elegant figure and manners gained him the favour of the court, he espoused the popular side, was one of the few nobles who joined the *tiers état*, voted on August 4, 1789, for the equality of citizens, and was in consequence appointed secretary to the National Assembly. He served with distinction in the army of the north, but retired to his country residence on its being determined to exclude nobility from the service. Being accused of having participated in the surrender of Mainz, he was sentenced to death by the revolutionary tribunal, and guillotined 23d July 1794. He had married, at an early period in his career, Mdlle. Josephine Tascher de la Pagerie, who, after his death, became the wife of Napoleon Bonaparte. The latter adopted Eugène and Hortense, the son and daughter of B. Hortense became Queen of Holland and mother of Napoleon III.

Beauharnais, Eugène de, son of the Vicomte de B., was born in Paris, September 3, 1781. On his mother's marriage with Napoleon he threw in his fortunes with his stepfather, and never deserted him. By force of character and military ability he rapidly rose to a high position, was made Viceroy of Italy, and in 1805 Prince of France and Venice, and declared by Napoleon his adopted son, and heir to the crown of Italy. B. showed very considerable administrative ability; and throughout his life had the character of being a man of probity and honour. During the Napoleonic wars his talents as a commander were of the greatest service to his stepfather; and it was he who, along with Ney, saved the French army from total destruction after the disastrous expedition into Russia. The fifty days'

march from Poznan to Leipsic of the 12,000 famished spectres, the relics of the great host that had crossed the Niemen, seems the most heroic incident in the campaign, and one can appreciate Napoleon's words—'We have all committed faults, except Eugène.' Before leaving for Italy he won the battle of Lützen. After the Hundred Days he retired to Bavaria; and having purchased from the king, whose daughter, Amalie Augusta, he had married, the landgraviate of Leuchtenberg and principality of Eichstadt, became known as Duke of Leuchtenberg. He died 22d February 1824. His two sons, Auguste Charles and Maximilien-Joseph, succeeded in turn to the duchy. The former married Queen Donna Maria of Portugal, and died 28th March 1835; the latter married the daughter of the Emperor Nicholas of Russia, was also well known in the scientific world as a keen mineralogist, and died November 1, 1852. For the history of the Viceroy, see Gallois, *Histoire du Prince Eugène de B.* (Par. 1821); Aubriet, *Vie Politique et Militaire d'Eug. B.* (Par. 1824); and Armandi, *Vie Militaire du Prince Eugène*, &c. (Par. 1843).

Beaumarçiais, Pierre Augustin Caron de, a French wit and poet of bright and lively genius, was the son of a watchmaker named Caron, and was born in Paris, 24th January 1732. After a somewhat light and careless youth, he betook himself to his father's business with zeal; made a little invention, a new sort of escapement; was appointed *Horloger du Roi* (1753); married a widow, Madame Franquet (1757), and from a little property of hers took the aristocratic name of B. In 1768 he married a second time, obtaining on this occasion a splendid fortune with his wife. Meanwhile devoting himself to literature, he produced, in 1767, *Eugénie*, a drama in five acts; *Les Deux Amis, ou Le Négociant de Lyon* (1770); *Le Barbier de Séville* (1775); and *Le Mariage de Figaro* (1784). On these last two well-known productions his fame now rests. He lost largely by the publication of a complete edition of the works of Voltaire, for whose manuscripts he had paid 200,000 francs. B. died May 19, 1799. M. de Loménie gave an interesting record of the life and times of B. in several papers in the *Revue des Deux Mondes*, which, in 1855, were published as a biography in 2 vols. An edition of his works, with an introduction by M. Saint-Marc Girardin, was published at Paris in 1827, in 6 vols. 8vo.

Beaumaris (Fr. 'fair marsh'), the chief town of Anglesea, N. Wales, on the W. side of the beautiful bay of B., near the N. entrance to the Menai Strait, 238 miles N.W. of London, by the Holyhead Railway. It is said to owe its origin to the castle built here by Edward I. in 1295, of which the ivy-covered ruins still exist. B. is a favourite watering-place, has a good harbour, and exports marble, slates, copper, and other metals. The number of vessels that cleared the port in 1873 was 2978, of 809,181 tons. Along with Amlwch, Holyhead, and Llangefni, B. returns one member to Parliament. Pop. (1871) 2291.

Beaumont, Francis, poet and dramatist, best known by his literary partnership with John Fletcher (q. v.), was the third son of Sir Francis B., Justice of the Common Pleas, and was born at Grace Dieu, Leicestershire, in 1586. He was ten years younger than Fletcher, but predeceased him by ten years, dying in 1615 at the early age of thirty. B. wrote a number of miscellaneous pieces of poetry, distinguished, some by lyrical sweetness, and others by wit, one of the best being a *Letter to Ben Jonson*, of whom he was a friend and warm admirer. It was about 1612 that he became acquainted with Fletcher, and so friendly did they become, that they lived in the same house till B.'s marriage, in 1613, to Ursula, daughter of Henry Isley of Sundridge in Kent. A mystery rests on B.'s share in the authorship of those plays which bear his name and Fletcher's; and for long a vague belief prevailed that he wrote the graver and tragic, Fletcher the lighter and comic, portions. It seems, however, to be the general opinion, as expressed by Mr Minto in his recent *Characteristics of English Poets*, that 'B.'s chief share lay in correcting the exuberance of Fletcher.' The character and merits of conjunct work will be considered in the art. **FLETCHER**. See also Ward's *English Dramatic Literature* (Lond. 1875).

Beaumont, Gustave Auguste de la Bonnière de, a French publicist and writer, was born at Beaumont-le-Chartre (Sarthe), December 2, 1802. In 1831 he was sent with Tocqueville to America to study prison discipline. On his return he devoted himself to politics, and after the revolution of 1848 was appointed ambassador to the English court by Cavaignac. He

suffered imprisonment for a time in 1852, and died at Tours, April 2, 1866. His chief works are *Du Système pénitentiaire aux Etats-Unis et de son Application en France* (2 vols. 1832, 3d ed. 1845); and *L'Irlande, Sociale, Politique, et Religieuse* (2 vols. 1839, 7th ed. 1863).—**B. Vassy**, Edouard Ferdinand de la Bonnière, Vicomte de, a cousin of the above, born 1813, has written several works of romance, as *Une Marquise d'Autrefois* (Par. 1839); besides the *Histoire des Etats Européens depuis le Congrès de Vienne* (Par. 1843-53).

Beaumont, Jean Baptiste, Armand, Louis Leonce (Elie de), a celebrated French metallurgist and geologist, was born at Canon, in the department of Calvados, 25th September 1798; in 1832 became Professor of Geology in the Collège de France, and Chief Engineer of Mines; in 1835 was chosen member, and in 1853 secretary, of the Académie des Sciences. He has written numerous works; among others, *Mémoires pour servir à une Description Géologique de la France* (1833-38); *Observations Géologiques sur les différentes Formations dans le Système des Vosges* (1829); and his chief work, *Carte Géologique de France* (2d ed. 1855). His name will probably remain most associated with his theory as to the separate periods of elevation of the terrestrial mountain systems.

Beaune, a town in the department Côte-d'Or, France, near the source of the Bouzaise, 23 miles S.S.W. of Dijon by railway. It is beautifully situated at the foot of the Côte-d'Or, and contains many fine buildings, of which the chief are the collegiate church of Notre Dame, founded in 976, and a grand hospital of the 15th c. The clock-tower of the old town-hall (*le beffroy de B.*) is singularly picturesque. In the arrondissement of B. there is produced much first-rate wine of the kinds known as *B., Pommard, Volnay, Romanée, Clos-Vougeot*, &c. Pop. (1872) 10,100. B., supposed to have derived its name from the Latin *Bellona*, and to have had a Roman origin, was certainly a fortified town in the 7th c. It was long governed by hereditary counts, and was frequently the residence of the Dukes of Burgundy.—**B. la Rolande**, a town in the department Loiret, 24 miles N.E. of Orleans, with a pop. (1872) of 927.

Beaune, Florimond, a distinguished French mathematician, and a great friend of Descartes, was born at Blois in 1601, and died 1652. He was the first to determine the nature of curves by the properties of their tangents. His only extant work is *De Aequationum Limitibus Opuscula duo, et Nola breves*, printed in the *Géométrie Latine* of Descartes.

Beauregard, Peter Gustave Toutant, a Confederate general during the American War of Secession, born in 1818, near New Orleans. He entered the military college at West Point in 1834, graduated in the Corps of Engineers in 1838, distinguished himself under General Scott in the Mexican campaign; in 1853 was appointed surveyor of the fortifications on the coast of the Gulf of Mexico, and in 1860 superintendent of the Military Academy at West Point, an office which he held only five days. He resigned his commission in the U.S. army, February 20, 1861, and joining the Confederates, commenced the war by bombarding Fort Sumter, April 12. He inflicted a signal defeat on the Federal troops at Bull Run, July 21; was second in command at the battle of Shiloh, April 6, 1862, and held the chief command after General A. S. Johnston was killed; and during 1862-64 defended Charleston successfully against Generals Gillmore and Hunter. In 1864 he defeated General Butler at Drury's Bluff, and defended Petersburg against the attacks of Grant and Meade. After the capture of Richmond he surrendered to General Sherman, at Greensboro, in April 1865. Since the re-establishment of the Union, he has been president of railways in Louisiana. B. has quietly adapted himself to the altered condition of political affairs in his country.

Beauty. See **ÆSTHETICS**.

Beauvais, the capital of the department of Oise, France, at the junction of the Avelon and the Thérain, 40 miles N.N.W. of Paris, formerly within the old province Ile de France. It was the chief town of the ancient *Bellovacum*, was called by the Romans *Casaramanus*, later *Bellovacum*, from its original occupants, and was known as *Belvacum* in the middle ages. The Norsemen sacked B. in 886 and again in 1180, when they had become Normans; the English unsuccessfully besieged it in 1443; and in 1472 the Burgundians under Charles the Bold were repulsed, chiefly by the valour of Jeanne Lainé, surnamed

La Hachette from the battle-axe with which she fought. There is still an annual fête in honour of the latter victory, when the Burgundian flag which was captured by La Hachette is borne by a procession of girls: a monument was erected to her in 1850. B. is the residence of a bishop (it was a bishop of B. who accused Joan of Arc of sorcery and heresy), and has a splendid Gothic cathedral, commenced about 1225, the choir of which is said to be the loftiest in the world, rising 153 feet from floor to ceiling. There are celebrated manufactures of woollens, shawls, carpets, and Gobelin tapestry. Pop. (1872) 13,532.

Beaver, a genus of *Rodent* quadrupeds, forming the type of the family *Castoridae* of that order. The beavers possess distinctly developed clavicles or collar-bones. Each foot is furnished with five toes. The hinder toes are webbed, and adapt these feet for swimming. The incisor or front teeth—so characteristic in form, structure, and growth in all *Rodentia* (q. v.)—are large; and the molars, numbering eight in each jaw, exhibit a complicated folding of their enamel covering. The tail is flattened and scaly. The B. (*Castor fiber*) found in Northern Europe and Asia is the typical representative of the family. The American form, if at all different from the European B., is at most a variety, and not a distinct species, as some naturalists allege. In America the beavers live in social communities, but in N. Europe and Asia they appear to live singly or less singly. The B. averages about 2 feet in length exclusive of the tail; the latter appendage being about 10 inches long, and 3 inches in breadth. In general shape the B. is thickly set, and broad at the rump, narrowing suddenly towards the tail. The head is broad, and the snout abrupt. The ears are short and rounded, the eyes being of small size. The outer fur is coarse and long, the under fur being soft, silky, and closely set. The usual colour is a dark or chestnut brown, but lighter shades are not infrequently met with. In habits the beavers are aquatic, these forms living in the neighbourhood of rivers and lakes.

social community, and when living together in numbers build dams across the rivers on the banks of which they reside. The stems of trees are gnawed across, and thus broken off, the lesser branches being woven together, and the entire structure being plastered with mud. In the latter operation, the flat scaly tail is used. Their houses or 'lodges' are built in the same fashion. Much that has been written and told of the extraordinary habits and instincts of the beavers is utterly unworthy of credit, these animals exercising simply an ordinary amount of activity and instinct in the formation of their abodes. Their food consists of leaves, herbage, and bark, and it is alleged they occasionally fish, although there is little doubt that worms, &c., may form part of their dietary. The food is sometimes eaten by holding it between the paws, whilst the animal sits erect on the hind-legs. From two to seven young are produced at a birth in April or May; the young beavers being born with the eyes open. These animals are captured in traps. The winter generally drives them from their lodges, when they take refuge in holes or burrows excavated in the river banks, the entrances to which are trapped. The beavers afford a valued fur, upwards of 80,000 skins being imported annually into Britain from N. America. The substance employed in medicine, and known as *Castoreum* (q. v.), is also obtained from the B., and is secreted in glandular sacs placed in the vicinity of the generative organs, and named *preputial glands*. This secretion has probably some intimate connection with the reproductive habits of these forms. The American castoreum is alleged to be of inferior quality to the secretion of the Old World beavers. The fur has been used in England, chiefly for the manufacture of hats, from an early period—from the middle of the 17th c. at least. The flesh of the B. is oily and strong-tasted. The Coypu (*Myopotamus Cuypus*) of Chili, and the Musquash (*Fiber Zibethicus*) of N. America, are also included in the B. family. The beavers are represented in a fossil state in Miocene and Pliocene deposits. The *Castor spelæus*, or cave-B., found in European caves and bone-deposits, is indistinguishable from the existing B. The



Beaver

large *Trogontherium*, found in European Post-tertiary deposits, may be included in the same genus with the B. The *Castoroides ohioensis* of N. American Post-tertiary deposits is a distinctly specific or generic form from the existing American B. This latter form attained a length of five feet.

Beaver. See **HELMET**.

Beaver-Wood, or Beaver-Tree, *Magnolia glauca*, a native of Pennsylvania, Virginia, and Carolina, 15 to 20 feet in height, with beautiful fragrant white flowers. The bark is tonic and aromatic, resembling that of Cinchona (q. v.) in its action. The unripe fruits of *M. fraseri* and *M. acuminata* have similar properties. B. W. is also called White Bay and Swamp Sassafras.

Bebeerine, or Bib'irine. Under this name an alkaloid was in 1835 obtained from the Greenheart-Tree (q. v.), which was introduced into medicine as an effective febrifuge, and a substitute for quinine. Recent investigations have demonstrated that it is identical with buxine, an alkaloid obtainable from the common box, *Buxus sempervirens*.

Bebeer, or Bib'iri. See **GREENHEART**.

Beccaf'oo (Sylvia or Curruca hortensis), an Italian name applied to the garden warbler or pettychaps, a passerine bird included in the family of the *Sylvidae* or Warblers (q. v.). It occurs in Britain; but is more common in Italy and S. Europe, where it is valued as a table delicacy. It is migratory in habits, wherever found. The upper parts are coloured brown, and the under parts white.

Beccamoschi'no (Sylvia isticola), a member of the family *Sylvidae* or Warblers (q. v.), so named by the Italians. It occurs in Italy, and makes a nest like that of the tailor-birds, of leaves and vegetable fibres curiously interwoven.

Beccaria, Cesare Bonesana, Marchese de, a political and social writer of Italy, born at Milan in 1735, was a pupil of the Neapolitan economist Genovesi, and afterwards a leading member of the literary society which existed in Milan for some time before the French Revolution. In 1762 he published a work on the currency of Milan, and in 1764 produced his noble *Trattato dei Delitti e delle Pene*, which has been translated into most European languages. In 1768 he became a Professor of Political Philosophy at Milan, where he died, 28th November 1794. His lectures are published in a series of *Italian Economists* (Milan, 1804). A complete edition of B.'s *Opere* was published by Villati in 1854. The main idea of his *Essay on Crimes and Punishments* (on which Voltaire wrote a short commentary in the 34th volume of his collected works) is, that in each case punishment should be adjusted so that the dread of it may counterbalance the particular motives to crime, and should also be immediate and certain, not depending on the discretion of the bench. The probability of prevention alone justifies the infliction of suffering. This principle leads B. to oppose capital sentences, torture, and many prevailing notions on judicial procedure and criminal law. The essay is the work of a keen mind and a warm heart; it develops the suggestions of Montesquieu, and laid the foundation of many legal reforms. It concludes with the following general theorem: 'That a punishment may not be an act of violence, of one or of many, against a private member of society, it should be public, immediate, and necessary, the least possible in the case given, proportioned to the crime, and determined by the laws' (p. 135, Edinb. transl. 1778).

A common French name applied to many small birds, belonging chiefly, but not exclusively, to the *Sylvidae*.

Beccard, Thomas de la, an English geologist, born 1796, educated at the military school at Sandhurst, entered the army in 1814, and served in the army of Great Britain, which was afterwards sent to the continent, and of which he was appointed a captain, and subsequently became director of the British School of Science. He died 13th April 1855. B. was the author of a treatise *On the Discovery of a New Fossil Animal*, the *Pleiosaurus* (1823), *Geology of Jamaica* (1826), *Classification of European Rocks* (1828), a *Geological Manual* (1831), *Researches in Theoretical Geology* (1834), *The Geology of Cornwall, Devon, and West Somerset* (1839), and *The Geological Observer* (1851, 2d ed. 1853).

Beche-de-Mer, or Trepang, an edible marine slug, procured on the coral reefs of the Pacific, and cured in immense quantities for the Chinese market. There are many varieties of B., all species of *Holothuria*, of which ten kinds are marketable in China; and of these, four are of a superior quality. They are of an oval shape, dark-coloured on the back, and vary in length from 6 to 24 inches. Much skill and care is required in the operation of curing, which is performed by gutting and boiling the slugs, and spreading them out on a perforated platform over a wood fire to dry. Sun-dried B. is esteemed a great delicacy in China, and is in special request for making soups.

Bech'er, Johann Joachim, a German chemist and physicist, was born at Speier in 1625. After a youth of great hardship and laborious study in all branches of physical science, he became a professor at Mainz; was elected a member of the Imperial Council at Vienna in 1660, but fell into disgrace, and returned to Mainz. Subsequently he lived in Munich, Würzburg, Haarlem, and London, where he died in October 1682. Though he adopted many of the fanciful theories of the alchemists, yet his principal work, *Actorum Laboratorii Chymici Monacensis, seu Physicæ subterraneæ Libri duo* (Frankf. 1669, and again 1675, with additions in 1681), was the first attempt to establish a logical connection between physics and chemistry. His other writings are numerous, but not valuable.

Bech'uans, or Betjuans, a scattered people, occupying the country S.W. of Lake N'yassa, and on both banks of the Zambesi, S. Africa, between 15° and 28° S. lat., and from 23° to 29° E. long. They are allied to the Kaffirs, but are less intellectual and less warlike, living chiefly by husbandry and cattle-rearing, and working with some skill in iron, copper, ivory, and skins. The chief tribes are Batoka, Basunga, Bayeye, Baquaina, Bakatla, Basuti, and Barolong. There are several rudely-fortified villages, the largest of which are Kuruman, Shoshong, and Kolobeng. The Boers (q. v.) of the Orange River States and Transvaal Republic have settled in the S. of the country of the B., whom they treat with great cruelty.

Beck, the name of several eminent Germans, of whom the following are the most important:—1. **Christian Daniel B.**, historian and philologist, born at Leipsic, 22d January 1757; became professor of Greek and Latin in the university of his native city, and died there, 13th December 1832. Among his numerous editions of the classics may be mentioned his *Pindar*, *Aristophanes*, *Euripides*, *Apollonius Rhodius*, *Plato*, *Cicero*, and *Calpurnius*. Besides these, B. wrote an *Anleitung zur Kenntniss der allgemeinen Welt- und Volksgeschichte* (4 vols. Leips. 1787-1805); *Grundriss der Archæologie zur Kenntniss der Geschichte der alten Kunst* (Leips. 1816), &c.—2. **Johann Tobias B.**, an able Protestant theologian, born at Bahlingen, in Württemberg, 22d February 1804; studied at Tübingen, became professor at Basel in 1836, whence he was called to Tübingen in 1843, and acquired a great reputation as a preacher and teacher. B. was one of the first to oppose, on the basis of independent scholarship, the conclusions of the critico-speculative school of Baur, and endeavoured to introduce a more exact study of the New Testament literature. His chief works are, *Einleitung in das System der Christl. Lehre* (Stuttg. 1838); *Die Christl. Lehrwissenschaft nach den Biblischen Urkunden* (Stuttg. 1841); *Die Geburt des Christl. Lebens* (Basel, 1840); *Umriss der Biblischen Sittenlehre* (Stuttg. 1853, 2d ed. 1862); *Gedanken aus und nach der Schrift* (Frankf. 1859, new ed. 1868); *Christliche Reden* (six collections since 1834).—3. **Karl B.**, a lively, picturesque, and musical poet, born 1st May 1817, at Baja, in Hungary, was the son of a Jewish merchant converted to the Protestant religion; studied at Vienna, and after some time settled in the Austrian capital. He has written *Nächte. Gepanzerte Lieder* (Leips. 1838); *Der fahrende Poet* (Leips. 1838); *Stille Lieder* (Leips. 1839); *Saul*, a drama (Leips. 1841); and *Junko, der Ungar. Rosshirt* (Leips. 1842, 3d ed. 1853), a metrical romance. His *Gesammelten Gedichte* appeared in 1844, and again in 1854. Since then B. has written, among other things, *Lieder vom armen Manne* (Berl. 1846, 4th ed. 1861); *Aus der Heimat* (Dr. 1852, 4th ed. 1862); *Mater Dolorosa* (Berl. 1853); *Jaduh* (Leips. 1863); and *Still und Bewegt* (1870).

Beck'er, Gottfried Wilhelm, a German physician and prolific author, born February 22, 1778, at Leipsic, where he studied, took his degree, and practised medicine for upwards of

thirty years. He died January 17, 1854. Among his writings, which are literary rather than scientific, may be mentioned *Beschreibung von Leipzig* (1806); *Gemälde von Leipzig* (1823); *Reisebilder aus Süd-Deutschland* (1837); *Andreas Hofer* (1841); *Ägypten wie es jetzt ist* (1841); *Napoleon, dargestellt nach den besten Quellen* (1846-47). B. left his fortune (53,000 thalers) to found a blind-asylum in Leipsic.

Becker, Johann Philipp, a German politician, born at Frankenthal, Rhenish Bavaria, 19th March 1809, and brought up to the trade of a brushmaker. The events of July 1830 turned his attention to politics, and he became an ardent advocate of radical opinions, for promulgating which he was several times imprisoned. Withdrawing to Switzerland in 1838, he took a prominent part as a journalist; fought against the Sonderbund in 1847, and in 1848 organised volunteer corps among the German emigrants and Swiss radicals to aid the South German revolution. On the failure of Hecker's preliminary attempt, B. returned to Switzerland, and resolved to march with his corps to the help of the insurgents in Rome and Sicily. The outbreak in the Palatinate and in Baden altered his purpose. He hastened to the scene of action; reached Karlsruhe, 17th May 1849, covered the retreat at Waghäusel, commanded at Durlach (25th June), was present in several other engagements, and on the suppression of the revolution settled in Geneva. He reappeared in the Franco-Italian war against Austria (1859-60), when he was employed to organise a German battalion to act under Garibaldi; and again in 1863-64, when the Schleswig-Holstein difficulties began, with a theory of a 'People's Union,' which excited no attention. B. wrote in conjunction with Esselen a *Geschichte der Süd-Deutschen Mai-Revolution* (Gen. 1849).

Becker, Karl Ferdinand, an eminent German philologist, born 14th April 1775, at Liser, on the Moselle; became a medical practitioner at Offenbach in 1815, and in 1823 converted his house into an academy. Devoting his leisure to linguistic studies, B. was led by philosophical speculation rather than by historical investigation to view language as an organism pervaded by ascertainable logical laws. From this point of view he wrote his *Ausführliche Deutsche Grammatik* (2d ed. 1843); an outline of it, *Schulgrammatik* (8th ed. 1862); *Organism der Deutschen Sprache* (1841-42), &c. B. died at Offenbach, 5th September 1859.

Becker, Karl Ferdinand, son of Gottfried Wilhelm B. (q. v.), was born at Leipsic, 17th July 1804, received his early musical training from Schicht and Schneider, and became Professor of the Organ at the Leipsic Conservatoire in 1843, a post which he resigned in 1856, to devote himself exclusively to study. He is a great, probably the greatest, authority in Germany upon the history and construction of that instrument, for which he has composed excellent music. He is one of the best German writers upon the history of music, and has written largely also upon the chorale, the hymn-tune of the Lutheran Church. Among his works may be mentioned *Systematische-chronologische Darstellung der musikalischen Literatur* (Leips. 1836); *Die Hausmusik in Deutschland in dem 16ten, 17ten, und 18ten Jahrh.* (Leips. 1840); and *Die Choral-sammlungen der verschiedenen Christl. Kirchen* (Leips. 1841).

Becker, Nikolaus, the author of the famous German *Rheinlied*, was born 15th January 1810, at Geilenkirchen, in Rhenish Prussia, and in 1840, when the war-party in France threatened the seizure of the left bank of the sacred river, set the patriotism of his countrymen on fire by his *Sie sollen ihn nicht haben*, which, though not a wonderful poem, was everywhere sung with enthusiasm. The French were stirred into a jealous rage, and Alfred de Musset wrote a witty but rather ignoble answer, *Nous l'avons eu votre Rhin Allemand*. B. died after a lingering illness, 28th August 1845. A collection of his *Gedichte* was published at Cologne in 1841.

Becker, Wilhelm Adolf, a German archaeologist, was born at Dresden in 1796; studied philology and theology at Leipsic, and travelled in Italy in 1840. He was called to the chair of archaeology at Leipsic in 1842, and died at Meissen, 30th September 1846. B.'s knowledge of classical antiquity enabled him to reproduce private life at Rome and Athens in a series of compendious but interesting portraiture, the former in his *Gallus, oder Römische Szenen aus der Zeit Augustus* (2 vols. Leips. 1838, 3d ed. 1863); and the latter in his *Charikles, oder Bilder Alt-*

Griechischer Sitten (2 vols. Leips. 1840, 3d ed. 1854). These works have been translated into English by Metcalfe. His *Handbuch der Röm. Alterthümer* (Leips. 1843-46) was continued after his death by Marquardt, and is in some respects his chief work. The *Gallus* and *Charikles* display great powers of combination and research, and are exquisitely finished.

Beckerath, Hermann von, a German politician, born at Krefeld in Prussia, December 1801. On the accession of Friedrich Wilhelm IV. in 1840, B. resolved to work for the constitutional freedom of his country, and for several years was an influential member of the Provincial Diet. He was a deputy in the National Assembly which sat at Frankfurt in 1848, received the portfolio of Finance at Berlin, but being unsuccessful in constructing a cabinet, he returned to Frankfurt. Though a zealous advocate of German unity, he refused to promote it otherwise than by constitutional means. As a member of the second Prussian chamber, he strenuously opposed the retrograde policy of Manteuffel, and withdrew from active politics in 1852. Failing health decided him to refuse to sit again on his re-election in 1858. He died at Krefeld, 12th May 1870.

Becket, Thomas, the son of Gilbert B. (a London merchant of Norman family), was born 21st December 1117. He probably studied at Paris, and in 1142 he attached himself to Theobald of Canterbury, who in 1153 made him archdeacon of Canterbury. During these years B. went to Rome about the legate privileges of Canterbury, and the proposed succession of Eustace to King Stephen. On Henry's accession (1154) he was made chancellor, a position of wealth as well as dignity. He became a pluralist in Church and State, and lived magnificently on the proceeds of vacant benefices. In the campaigns against Louis VII. he did service in the field, and defrayed part of the costs of the war by 'second subsidies' from the clergy, and by a scutage of £3 on the knights' fees. On 3d June 1162 B. succeeded Theobald as primate, and resigned his chancellorship. He at once began a life of the strictest discipline and self-devotion to the Church. His claims to excommunicate at pleasure the king's tenants, and that priests guilty of murder and rape should be amenable only to spiritual courts, were angrily opposed by Henry, who (after demanding at the council of Westminster that convicted priests should be 'degraded') in 1166 submitted to his great council the celebrated Constitutions of Clarendon, which, professedly codifying the ancient customs of the realm, provided not merely for the supremacy of the king's courts in matters both civil and criminal affecting the clergy, especially in the matter of advowsons, but also for the control by the king of ecclesiastical presentations, and the discontinuance in all cases of appeals to Rome. After resistance, B. was forced to swear to obey these councils; but, although important as a declaration of national feeling, the chief articles were annulled by Pope Alexander III. In the same year, at the Council of Northampton (in which Norman bishops sat), B. was tried for alleged failure to account for moneys received by him as chancellor. He declined to receive sentence, formally appealed to Rome, and fled under the assumed name of Brother Christian to the Abbey of Pontigny in Burgundy, and afterwards to Sens. Henry deposed him from his see and confiscated his possessions, but B., supported by Pope Alexander, who made him legate for England, and by Louis VII., continued to assert his authority by issuing from Vezelay sentences of suspension and excommunication on English priests and laymen, e.g., on Gilbert Foliot, Bishop of London, in 1167. In 1168, however, after an attempt to mediate through cardinal-legates, the Pope suspended B. for a time, but next year the coronation of Henry's son by the Archbishop of York, in defiance of a bull, improved the exile's position considerably. Finally, in 1170, a reconciliation was arranged between Henry and B. at Feretville in Touraine. Returning to Canterbury, where he was well received, B. put into force sentences of excommunication issued by the Pope against three independent English prelates. This probably was the occasion of his murder on 29th December 1170. The murderers were at once excommunicated, but do not seem to have suffered any temporal punishment. In 1174 Henry performed penance at the tomb of B., who had previously been canonised; he also undertook large obligations to the Pope's envoys. Until the Reformation pilgrimages were frequent to the shrine in which the saint's bones were deposited by Henry III. So late as 1857 Pius IX. confirmed the celebration of an annual festival (a double of the

first class with an octave) in memory of St Thomas. See Canon Morris's *Life and Martyrdom of Saint Thomas B., Archbishop of Canterbury*, and *Legate of the Holy See* (Lond. 1859); Canon Robertson's *B., Archbishop of Canterbury* (Lond. 1859); and Freeman's *Historical Essays* (Lond. 1872). The last-mentioned is particularly valuable for the lucidity and breadth of its historical portraiture. It gives in all probability the most just estimate, at once liberal and strictly critical, of a man who has been the subject alike of extravagant praise and unmerited blame.

Beek'ets, the nautical name for hooks, pieces of rope, or brackets on which to fasten ropes, tackles, oars, or spars.

Beck'ford, William, an eccentric English author, was born in 1760. He was the only legitimate son of the celebrated Alderman B. At nine years of age, B. succeeded to his father's property, the income from which, including the celebrated Fonthill, in Wiltshire, amounted to £100,000 a year. In 1780 he came before the public as an author, with an essay entitled *Biographical Memoirs of Extraordinary Painters*, which had the tone of showing his powers of wit and sarcasm. The two subsequent years were spent in restless travel. In 1783 he entered Parliament as member for Wells, and in 1784 married Lady Margaret Gordon, daughter of Charles, Earl of Aboyne; and in the same year appeared an English translation (by Dr S. Henley, Vicar of Rendlesham) of his celebrated Arabian tale of *Vathek*, which he had written in French, he himself says, 'in three days and two nights.' The original French first appeared at Lausanne in 1787. *Vathek* obtained for the author, from the extraordinary powers of sarcasm and description which it showed, a great and almost unique name in British literature. The remainder of B.'s life was spent in travel and impulsive actions, and latterly in absolute retirement, except during the short period in which he sat in Parliament. He erected a remarkable mansion at Fonthill, and then, in a freak, sold it for £350,000 to Colonel Farquhar. Similarly he bought Gibbons' library at Lausanne, and then handed it over to his physician, Dr Scholl. He wrote nothing remarkable after *Vathek*, although in 1834 he produced a work upon Italy, Spain, and Portugal, and, in 1835, *Recollections of an Excursion to the Monasteries of Alcobaca and Batalha*. Always a hard student, B. finally shut himself up with his books and fancies. He died 2d May 1844.

Beck'mann, Johann, a meritorious German author, born at Hoya, Hanover, June 4, 1739. He was Professor of Natural Philosophy at St Petersburg from 1763 to 1765, thereafter travelled in Sweden to acquaint himself with the working of mines, and in 1766 became a professor, first of Philosophy, and in 1770 of Political Economy, at Göttingen, where he died, February 4, 1811. B. was the first German who wrote scientifically on agriculture and commerce. Among his numerous other writings are *Anleitung zur Technologie* (5th ed. Gött. 1809); *Physiko-Oekonomische Bibliothek* (33 vols. Gött. 1770-1808); *Beiträge zur Oekonomie, Technologie, Polizei und Kameralwissenschaft* (11 vols. Gött. 1779-91); and *Beiträge zur Geschichte, der Erfindungen* (5 vols. Leips. 1780-1805), the last of which has been translated into English by Bohn, and is still valuable.

Beo'querel, Antoine César, an eminent French physicist, was born at Châtillon-sur-Loire (Loiret), March 7, 1788. On leaving the Polytechnic School in 1808, he became an officer of engineers, and served in Spain under General Suchet. In 1815, he quitted the military service, and subsequently turned his attention to electricity. Elected a member of the Academy of Sciences in 1829, he has since then been a very voluminous writer on chemical and electrical subjects. Of his numerous works we may mention his *Traité de l'Electricité et du Magnétisme* (7 vols. Par. 1834-40; new ed. 1855-56, with additions, 1858); *Traité d'Electro-chimie* (Par. 1840); and in conjunction with his son, **Alexandre-Edmond B.** (born March 24, 1820), *Éléments de Physique terrestre et de Météorologie* (1847). The latter was made Professor of Physics in the Paris Conservatoire des Arts in 1853, and has written a good deal on the solar spectrum, magnetism, and electricity.

Beo'se, Neu, or Turkish B., a town in the county of Torontal, Hungary, 40 miles S.E. of Zombor, on the Theiss, with a trade in cotton goods and tobacco. It is also one of the largest corn-markets in the Austrian empire. Pop. (1869) 7193.—**B., Alt**, or Servian B., on the Bacsa Canal, 5 miles W. of the above, has also a great trade in corn.

Beo'skerék, Nag'y (i.e., Great B.), the capital of the county of Torontal, Hungary, 45 miles S.W. of Temesvar, lies on the Bega Canal, here crossed by a fine bridge. It has an old ruined castle, several fine buildings, a Greek church, and a Roman Catholic college. There is considerable trade in corn and cattle, and fishing and bee-keeping are carried on. Pop. (1869) 19,664. **B., Kis**, or Little B., is a village in the county of Temes, 8 miles N.N.W. of Temesvar, with some trade in wool and honey. Pop. 3004.

Bed, the sleeping-place of mankind, which, in modern times, is an article of furniture consisting of bedding and B.-hangings, with a bedstead or framework to support them. When man led a nomadic life, he doubtless spread leaves or other materials on the ground and slept thereon, the device of a bedstead belonging to less remote times, when people aggregated in towns, and built permanent dwellings. Domestic comfort increased with the progress of civilisation, and from mural paintings we know that the Egyptians used couches, ottomans, and other articles of furniture which are now indispensable to ease and luxury. It would appear that the divan by day served, with the addition of some kind of bedding, as a B. by night, as is still the custom among Western Asiatics. Wicker bedsteads, similar to those of the modern Egyptians and Arabians, formed of the mid-ribs of palm leaves, are also figured in Egyptian painting, and early Egyptian head-rests of wood and alabaster, of a crescent shape, are preserved in the British Museum. There are frequent allusions in Holy Writ to the great luxuriousness of beds and B.-hangings among the ancient Jews. In the heroic ages of Greece, beds consisted of skins, or dried herbs spread on the ground. In later times the wealthy Greek had his mattress and pillows stuffed with wool, and rugs, carpets, and linen sheets for B.-clothes; his bedstead was a magnificent object, being made of costly wood inlaid with tortoiseshell, or of ivory, and adorned with feet of silver; it always had a head-board, and sometimes a foot-board also, in which case it would resemble a modern French B. During the Roman empire, mattresses were stuffed with down or swans' feathers, coverlets were formed of rich textiles of a purple colour, and embroidered with gold, and bedsteads even surpassed in splendour those of the Greeks. The use of B.-curtains by the Greeks and Romans is not distinctly alluded to by ancient writers, but the fact that the dinner-couch was adorned with drapery, makes it probable that the B. was so also. The Anglo-Saxons usually slept on a sack filled with straw, laid on a bench in a recess at the side of the room; bedsteads were rare even among the rich, and the skins of goats and bears were used as coverlets. From ancient illuminated manuscript drawings, it would appear that the Anglo-Saxon entered his B. in a nude state—this custom prevailed even till Queen Elizabeth's time—and, enveloping his body in a sheet, drew the coverlet over him. In early Norman times the tester B., or B. with back and roof, was introduced, and while the mattress was still of straw, a greater degree of taste characterised the B. coverings and hangings. A little later, straw was replaced by down, and sheets of rich silks, and coverlets of green say or cloth, made of the hair of the badger, were not uncommon. The simple and unadorned bedstead of the Norman period continued in use till the 15th c., when the *celure* or roof, and the *tester* or back, which were independent of the bedstead proper, and attached to the wall and ceiling, were decorated with coats-of-arms and other carved ornaments; canopies were also enlarged, and *costers*, or ornamental cloths for the sides of the B. now appear. At this period feather-beds were so valued as to be bequeathed like other property. The large four-posted bedsteads were introduced in the 16th c. and had their origin in an arrangement like a square tent, in which the curtains were not suspended from the roof as hitherto, but on a frame with four corner posts, inside of which the B. was placed. Fine examples of the four-posters of this period, with elaborate carvings, remain in some old mansion-houses. The celebrated 'B. of Ware,' still preserved in an inn at Ware, Hertfordshire, was made in the reign of Queen Elizabeth. It is remarkable for its size—12 feet square—and for its curiously-carved back, which, rising at the head, supports, with the aid of two massive pillars at the foot, a heavy canopy, beautifully enriched with carved work. The richly-embroidered counterpanes, and B.-hangings, display at this time a degree of unsurpassing splendour. The modern styles of bedsteads—Elizabethan, French, and tent, are too well known to call for more

than passing notice. In the march of improvement, feathers as a stuffing material have given way to curled horse hair, wood bedsteads are being replaced with those of iron or brass, or both metals, and other changes are being effected which tend to promote conditions of perfect cleanliness and ventilation with softness and elasticity. Of late years mattresses of small coils of wire, woven by an ingenious process of double weaving, have been made in Great Britain, and at Hartford, Connecticut, a similar industry has assumed large proportions. See AIR-BEDS and WATER-BEDS.

Bed, or **Stratum**, the term applied in geology to the *layers* seen in *sedimentary*, *aqueous*, or *fossiliferous* rocks, which result from the slow deposition in water of the soft sediment or materials from which the rocks were formed. It is the arrangement of these layers or beds that give to aqueous or water-formed rocks their regular and *stratified* appearance—a characteristic not seen in rocks formed by fire. Stratification or arrangement in beds is to be distinguished from *lamination*, or that property whereby, in virtue of the thin nature of the smaller layers composing a S., the B. or S. itself, may be split up into thin *lamina* or plates, as seen in many clay and slate deposits. Lamination generally results from the material of a S. having been deposited at short or appreciable intervals.

Be'da, or **Bede**, more properly **Bæda**, surnamed the **Venerable**, was born near St Peter's Monastery, Wearmouth, in 673. At the age of ten, he entered St Paul's Monastery at Jarrow, where he was ordained priest in his thirtieth year. The life of B. was that of a Christian scholar, not that of a Christian evangelist, and it is therefore little broken by outward events—strikingly contrasting in this respect with the picturesque career of Columba, the restless hero of the Scoto-Irish Church. B. attained a wide repute as a teacher, and many gathered to his monastery for instruction, besides the 600 monks who belonged to the house. His years were spent in gaining knowledge, and in spreading it, both by his teaching and his writings. This he esteemed the labour most proper to him; and so refused either to leave his monastery, or to hold any high office in it. His life was passed at Jarrow, and there he died in 735.

B. was the greatest scholar of his time in England, the 'father of English learning,' and had a fame not limited to the island. He was the first of moderns to grasp the true notion of history. Although there is a liberal infusion of the marvellous in his works, it can easily be severed from the narrative of facts. He must always hold a high rank among English men of letters as well as among English scholars; for, though he wrote chiefly in Latin, yet the spirit of his writings is thoroughly English, and the work on which he was engaged at his death was a translation of St John's Gospel into the mother-tongue. His learning was truly encyclopædic, embracing all subjects known in his own age and the ages before. Such science as the time possessed may be seen in his treatise *On the Nature of Things*; and he was also a master of rhetoric, grammar, music, poetry, philosophy, and medicine, on all of which he wrote. Besides these, he composed books on Church matters and theology, commentaries, digests, homilies, and religious biographies. But his great work is the *Historia Ecclesiastica Gentis Anglorum* (Church History of the English Nation), the fifth and concluding book of which was finished in 731, three years before its author's death. B. was fortunate in his subject, because the Church in England was at that time gaining a unity and organisation which the State did not possess till long after. The value of the *History* as an accurate and trustworthy record of events can hardly be over-estimated. Its sources were the chronicles of Roman and native writers, the records of the monasteries, and—most valuable of all—the personal and contemporaneous knowledge of the historian. All that we know of that interesting and most important period in English history—the 7th c. and first half of the 8th—is derived from B.'s history. It was translated into English under the care of King Alfred. A complete edition of B.'s works was published by Dr Giles (6 vols. Lond. 1843-44). Translations of the *History* were published by Hurst (1814), Wilcock (1818), and Giles (1840). The Latin original has been recently edited with English notes by Moberly (Macmillan, 1869).

Bedarieux, a thriving town in the department of Hérault, France, on the Orb, 18 miles N. of Beziers, with manufactures of fine and coarse cloths, hosiery, hats, leather, paper, oil, and soap, and a trade in wood and grain. Pop. (1872) 7374.

Bedchamber, Lords or Ladies of the, are officers of the British royal household, appointed to wait upon the king or queen. In the reign of a king the head officer is the Groom of the Stole. When a queen is regnant, the Mistress of the Robes is at the head of the officers of the B.

Bedd's Nuts, the fruit of a species of myrobalan (n. o. Combretaceæ, q. v.), *Terminalia Bellerica*, largely imported into this country from the E. Indies for the use of the tanner and to produce a very permanent black dye employed by calico printers. They are also called *bustard* and *belleric myrobalans*. The seeds are eaten by the natives in some parts of the E. Indies, but they possess narcotic poisonous qualities. The fruits of *T. Chebula*, under the name of *Chebulic myrobalans*, are also used in dyeing. The flowers are used in Travancore as a dye, and the fruits are purgative.

Bedd'oes, Thomas, M.D., an English physician, was born at Shifnal in Shropshire, April 15, 1760. At Oxford and Edinburgh, where he studied, he soon distinguished himself for his acquaintance with both ancient and modern languages, but his favourite studies were the natural sciences, especially chemistry, which he regarded as of great importance in the treatment of diseases. In 1787 he was appointed to the chemical chair in Oxford, which he resigned in 1792; and six years later, assisted by his father-in-law, Mr Edgeworth, he opened a pneumatic hospital at Bristol, which was successful only in bringing out the talents of Humphrey Davy, who was superintendent to the chemical laboratory. B. died 24th December 1808. Of his numerous works, may be mentioned *A Popular Treatise on Consumption* (1779); *Chemical Experiments and Opinions* (1790); *History of Isaac Jenkins* (1792); *Hygeia, or Essays Moral and Medical* (3 vols. 1802); and *An Essay on Fever* (1807). See Stock's *Life of B.* (Lond. 1810).

Beddoes, Thomas Lovell, son of Dr Thomas B. and of his wife Anna, sister of the novelist Maria Edgeworth, born at Clifton, 20th July 1803, entered at Pembroke College, Oxford, in 1820, went to Gottingen to study medicine in 1825, and continued to live much abroad till his death, at Basel, 26th January 1849. While still in his minority he had published *The Improvisator* (1821), and *The Bride's Tragedy* (1822). B.'s ambition was to be a dramatist; but though his verse was rich and musical, and his imagery at once felicitously and surprisingly original, his command of character and plot were too limited to render the realisation of that ambition possible; yet if single lines of Shakesperian quality could preserve the name of a writer, B. might hope to be remembered. In a posthumous work, *Death's Jest-Book, or the Fool's Tragedy* (1850), there are things which no dramatic poet has approached since the Elizabethan age. See Kelsall's *Memoir of B.* in his edition of the *Poems, Posthumous and Collected, of Thomas Lovell B.* (2 vols. Lond. 1851).

Bedeau, Marie Alphonse, a French general, was born at Vertou, near Nantes, August 10, 1804, and received his commission in 1825. He gained military distinction in Algeria, and was for a short time (1847) governor of the colony. He was in Paris on leave of absence at the time of the revolution of February 1848, and Marshal Bugeaud gave him command of one of the five columns which failed to quell the insurrection. The Provisional Government appointed B. commander-in-chief of the army of Paris, and he afterwards took a seat in the constituent and legislative assemblies as a republican deputy. On Louis Napoleon's *coup d'état* (December 2, 1851), he was arrested with others of his party, and subsequently retired into exile. He lived for many years in Belgium, but afterwards took advantage of the Emperor's amnesty, returned to France, and died at Nantes, October 30, 1863.

Bedell, William, a popular, learned, and pious divine of the 17th c., was born in 1570, at Black Notley in Essex. After an education at Cambridge, which ended in his taking holy orders, he went to Venice as the chaplain of Sir Henry Wotton, made the acquaintance of the celebrated Father Paul Sarpi, who gave him the MS. of his *History of the Council of Trent*, and other works, subsequently published in London. He returned to England, but it was long before he obtained preferment, mainly on account of his Calvinistic opinions. In 1629, however, he was appointed to the united bishoprics of Kilmore and Ardagh, Ireland. B. devoted himself with great energy and no little success to reform the abuses he found existing in his diocese, at the

same time that his virtue and amiability won him the esteem of the people. When the rebellion broke out, in 1641, the rebels, although they expelled him from his diocese, did not injure him, and when he died, February 7, 1642, they followed his body to the grave, and fired a volley over it, exclaiming, 'May the last of the English rest in peace!' Among the literary works B. either wrote or edited may be mentioned his translation of two volumes of Father Paul's *History of the Council of Trent*, a translation of the Old Testament into Irish, and a theological treatise on the two following subjects not without interest:—*Where was our Religion before Luther?* and *What became of our Ancestors who died in Popery?* His Life has been written by Bishop Burnet.

Bede's men or Bedasmen. See **BEAD**.

Bed'ford, a ducal title first borne by John Plantagenet, third son of Henry IV. He was born about 1389, and in his father's lifetime was governor of Berwick and warden of the Scottish marches. He fought for his father at the battle of Shrewsbury, and in 1422, by the will of his brother Henry V., was created regent of France. On his way thither, he destroyed a French squadron in the Channel; then rapidly conquered northern France, captured Meulan, made himself master of the line of the Yonne by a victory near Auxerre, and at Verneuil (1424) routed with immense slaughter the united chivalry of France and Scotland. But the blundering ambition of his brother, the Duke of Gloucester, cost him, for a time, the Burgundian alliance, and after it was restored, the devout heroism of Joan of Arc, inspiring the French with fresh courage and a sentiment of patriotism never known before, frustrated his efforts, though in military capacity he was hardly inferior to Henry himself. Though steadily and liberally supported by the Bishop of Winchester (see **BEAUFORT**), he abandoned all idea of retaining possession of the realm of France, and only sought to secure his conquest of Normandy. He died at Rouen, 19th September 1435, of vexation (it is said) on hearing that a treaty had been arranged prejudicial to English interests between the Duke of Burgundy and Charles VII. Like all the family of John of Gaunt, B. loved arts and literature, and while in Paris purchased and sent to London the library of Charles V. His widow, Jacobina of Luxembourg, married Richard Woodville, Earl Rivers, to whom she bore Elizabeth, wife of Edward IV., and ancestress of the Queen of England and of most European sovereigns. The title of **Duke of B.** was again borne for a short time by George Neville, nephew of Warwick, the 'king-maker,' and Henry VII. conferred it on his uncle, Jasper Tudor, Earl of Pembroke, who had given him important help on Bosworth Field (1485). Pembroke died childless in 1495, and the dignity lapsed for 200 years, when it was again revived (1694) in the house of Russell (q. v.), whose chiefs had been Earls of B. since 1550.

Bedford, the county town of Bedfordshire, on the Ouse, 65 miles N.N.W. of London by rail, situated in a rich arable district. It has important manufactures of agricultural implements, straw-plait, and lace, and contains also an extensive ironwork. The river, here crossed by a bridge of five arches, was formerly navigable, and the means of considerable trade with Lynn Regis, on the coast, 74 miles distant. The town is first mentioned in the *Chronicle* under date A.D. 571, in which year Cuthulf fought against the Britons at *Bedicanforda*, i.e., at the ford of the *bedyket* or fortified place. The name *Bedicanford* became in succession *Bedanford* and *Bedford*. It is again mentioned, A.D. 1010, as one of the places burned by the Danes in their horrible devastation of the S.E. of England. After the Norman conquest, a massive castle was built at B., which was frequently besieged in later times. In 1561, Sir W. Harpur, alderman of London, founded a free school at B., and its endowment of 13 acres of land has increased in value from £150 to upwards of £14,000 a year, with which sum a popularly-elected trust now maintains a free grammar school, commercial, preparatory girls' and infant schools; a children's hospital, and sixty-five almshouses. This immense charity is said greatly to prejudice the industry of the place. John Bunyan, who was born at Elstow, in the vicinity, wrote his *Pilgrim's Progress* in B. jail, and was for seventeen years minister of the Baptist congregation in Mill Lane. The Bunyan schools were transferred to a fine new building completed in 1867, and a bronze statue of Bunyan, by Boehm, was unveiled by Dean Stanley, June 10, 1874. Pop. (1871) 16,850. B. returns two members to Parliament.

Bedford Le'vel, a flat, marshy district on the E. coast of England, called also *The Fens*, situated to the S. and W. of the Wash, and comprising portions of the six counties, Lincoln, Northampton, Huntingdon, Cambridge, Norfolk, and Suffolk. It extends from the river Welland, in the S.E. of Lincolnshire, to the town of Milton, 3 miles N.E. of Cambridge; and from Peterborough, on the Nen, in Northamptonshire, to Brandon, on the Little Ouse, in Suffolk. Its length from N. to S. is about 40 miles, and its greatest breadth, the same. Area, about 400,000 acres. B. L. is divided into three levels: the N., lying between the rivers Welland and Nen; the Middle, between the Nen and the Old Bedford river; the S., lying to the S.E. of the Old Bedford river, and extending to Stoke, Feltwell, and Mildenhall. Writers of the 12th c. describe this district as a fruitful and agreeable country. In the 13th c. violent incursions of the sea stopped up the outflow of the rivers, its natural drains, and left it a morass. In the 15th c. partial attempts were made to drain it. In the 17th c., Francis, Earl of Bedford, whose title-name the district has retained, undertook to drain it on condition of receiving 95,000 acres of the reclaimed land, and obtained a charter to that effect from Charles I. Events hindered the completion of the work, but the charter was confirmed to his son by Parliament in 1649, and he fulfilled the contract. In 1688 the corporation of B. L. was formed, for the management of this peculiar district. The middle level has always been the worst to contend with. In 1862, St Germain's sluice, at the confluence of the great drain in this level with the Ouse, gave way, and the western bank of the drain burst, flooding about 6000 acres of fertile land; but extensive new works have been sufficient to prevent any recurrence of extensive mischief since.

Bedfordshire, one of the midland counties of England, 37th in respect both of size and pop., having an area of 463 sq. miles, and a pop. (1871) of 146,257. It presents for most part a flat surface, but in the S. is invaded by a spur of the Chilterns, and in the N.W. is traversed by another low range of chalk-hills. None of the hills are over 900 feet. The Great Ouse and its tributary the Ivel are the chief rivers, the former having a course within the county, including windings, of 45 miles. In the N. the geological formation is oolite, in the S. greensand and chalk, and the soil varies from the stiffest clay to the lightest sand, but is mostly under tillage. In 1873 there were 150,071 acres in corn. Onions, cucumbers, and other vegetables are extensively produced for the London and Cambridge markets. The principal towns are B., Luton, Polton, Biggleswade, and Dunstable, all centres of the manufactures of straw-plait for bonnets, and pillow-lace, the only existing industries. The straw-plait of B. rivals that of Tuscany. Two members of Parliament are returned for the county. B. contains the remains of three Roman roads, besides several fine specimens of early English and Norman church architecture. The Duke of B., the Marquises of Tavistock and Bute, Earl de Grey, Lords Holland and Carteret, are the chief proprietors.

Bed'lam, a corruption of Bethlehem, the name of a religious house in London, the Hospital of St Mary, Bethlehem, which was founded in the year 1246 by Simon Fitzmary, who had been one of the Sheriffs of London. It originally stood in Bishops-gate Street Without, and, on the suppression of religious houses in the reign of Henry VIII., was handed over to the corporation of London, since which time it has been an hospital for the cure of the insane. About 1644 it was determined to enlarge the hospital, but the situation had become close and confined, and a new Hospital of Bethlehem was built in Moorfields 1675-76. In 1814 the 'new' hospital gave way to a fitter building, in a more commodious situation, on the other side of the Thames, in the parish of Lambeth. This building in turn was enlarged in 1838. The patients of B. used to be exhibited, like wild beasts, in cages, for so much a head; and convalescent patients were sent out to beg, with badges on their arms, and known as 'B. beggars' or 'Tom-o'-Bedlams.' This practice, the object of which was to raise funds for the institution, was put down in the latter part of the 17th c.

Bed'mar, Alfonso de Cueva, Marquis de, a Spanish ecclesiastic and politician, born 1572, was appointed Spanish ambassador to Venice in 1607, and in 1618 (it is said) he united himself with the Duke of Ossuna, viceroy of Naples, and Don Pedro de Toledo, governor of Milan, in an infamous conspiracy

to destroy the city. A man of singular genius, penetration, knowledge of men and of the proper conduct of affairs, daring enough for the wildest ventures, yet perfectly tranquil under excitement, his conspiracy, which embraced the seizure of the arsenal, the Doge's palace, and the senate, and afterwards the sack of the city, was as ingenious as it was bold. It was to have been carried out on Ascension Day, and during the festal wedding of the Doge with the Adriatic; but on the eve of that day, when all preparations were complete, the plot was betrayed, the conspirators seized, tried in secret, and executed, and the Spanish ambassador dismissed from the republic. Otway's fine play, *Venice Preserved*, is based on the conspiracy. After leaving Venice, B. went to Flanders, where he was appointed president of the Spanish Council, and in 1622 obtained a cardinal's hat. He subsequently withdrew to Rome, and obtained the bishopric of Oviedo, where he died, 2d August 1655. Some writers, notably Grosley, in his *Discussion historique et critique sur la Conjuración de Venise* (Troyes et Paris, 1756), have endeavoured to show that the so-called 'conspiracy' was an invention of the Venetians, who wished to get rid of a hostile ambassador, but this view has not obtained much credence.

Bednors, or **Nugur**, a city in the division of Nugur, province of Mysore, India, situated among the luxuriant forests of the Western Ghats, at a height of 4000 feet, 145 miles N.W. of Seringapatam. In 1763 it was taken by Hyder Ali, and made the seat of his government. Twenty years later it was captured by the British under General Matthews, but soon retaken by Tippoo Saib. The division of Nugur has the oldest coffee plantations in Mysore.

Bed of Justice (Fr. *Lit de Justice*), originally the seat occupied by the French king in Parliament, afterwards applied to a session held by the king in presence of the princes, the estates, and the Presidents of the Chambers of Inquest and Chambers of Petitions, for the purpose of enforcing the registration of edicts. The constitutional fiction was that the authority of Parliament ceased in presence of the king. Thus, in 1407, on the death of the Duke of Orleans, a law regulating regencies during royal minorities was registered. The reign of Louis XIII. is marked by repeated protests of Parliament against the registration of taxation-edicts. In the following reign Omer Talon resisted the fiscal oppressions of Mazarin, but in 1667 an ordonnance declared that the Parliament held no absolute *veto*. In 1787 the refusal of the Parliament to register the land and stamp taxes and the successive loan proposed by Calonne and De Brienne led to the last B. of J. The popular contention was that only the States-General could grant supplies.

Bédos de Celles, Don Jean François, born at Chaux, 1714, died 25th November 1797. He was a Benedictine monk, and member of the Academy of Sciences in Paris. As the author of a great work on organ-building, *L'Art du Facteur d'Orgues* (4 vols. 1766 and 1778), he was the most noted authority upon that subject in the 18th c.

Bed-straw (*Galium*), a genus of plants belonging to the natural order *Galiaceæ* or *Stellatæ* (q. v.). It possesses many species, scattered over the temperate regions of the Old and New Worlds; is particularly abundant in Europe and Northern Asia, but is found also in the tropics, where, however, the species are chiefly confined to mountain regions. About ten species are found in Britain. Among them are some of the most common weeds, e.g., *G. cruciata* (crosswort or Maywort), *G. aparine* (cleavers or goose-grass), the inspissated juice of which has been used with success in various skin-diseases, and its seeds as a substitute for coffee. The recurved spines on the leaves cause it to stick to clothing. *G. verum* (ladies' bed-straw) is called also the cheese-rennet, because it has the property of curdling milk; and the flower-tops boiled in alum yield a bright yellow dye, much used in Iceland and in the Highlands of Scotland. The roots and bark have been long used to dye yarn red. The roots of other species of *Galium*, such as *G. tinctorium* of Canada, and *G. septentrionale*, another North American species, possess the same properties. Like Madder (q. v.), which they rival in dyeing qualities, they impart a red colour to the bones and milk of animals fed upon them. The extract of *G. rigidum* and *G. molle* has been beneficially used in epilepsy. The roots of *G. subserotum* are used in China for food. The name B. is said to be derived from the practice, at one time in vogue, of strewing beds with some of the softer foliated species.

Bed'uins (Arab. *Bedawi*, plural *Beduin*, i.e., children of the desert), the name universally given in the East as well as in Europe to the nomadic inhabitants of the deserts of Arabia, Syria, Egypt, and N. Africa. Scattered over an immense area (from the Atlantic on the W. to Persia on the E., and from the Syrian waste on the N. to the borders of Sudan on the S.), and ungoverned in a strict political sense, they roam hither and thither in families under *kuids* or *sheiks*, or in tribes under *emirs*, and live by cattle-breeding, trade, and occasional plunder. The religion of the B. is Mohammedan, and their habits are uniformly temperate. Polygamy is not prevalent. Their dress, which they themselves manufacture, consists of a *haikh*, or white robe, forming a hood, and descending to the feet, and a *burnuse*, or large open mantle. Their horses are noted for fleetness and docility. The B. are occasionally found intermingling with other nations, and among the five N. spurs of the Abyssinian highlands a few villages of this restless people have been established. Suakin, a Beduin town, with over 3000 inhabitants, lies on the W. shore of the Gulf of Suez, where, during the dry season, pasturage for camels and goats is procurable on the slopes exposed to the action of the damp sea-air. The life in the desert, precarious and full of danger, has given to the B. valour, activity, and endurance. It cannot escape observation, however, that modern travellers speak with contempt and pity of their present starved, stunted, and harmless condition. The name B. was originally applied only to the nomads of the Arabian deserts, and especially to those of the plateau of Nejid, in contradistinction to the *Hadesi*, who were engaged in agriculture and trade. But at an early date Beduin hordes had passed into the Syrian and Egyptian deserts, while with the decay of ancient civilisation they spread into Mesopotamia and Chaldea; and later the Mohammedan conquest of the 7th c. led them into N. Africa. It sometimes happens, as in the case of the Berbers of N. Africa, that the name B. is applied to nomad people who falsely claim an Arab origin, because they have adopted the Arab speech and habits. See E. H. Palmer, *The Desert of the Exodus* (1871).

Bed'win, **Great**, a town in Wiltshire, 69 miles W. by S. of London by railway. It was a place of note in the earliest times of English history, and figures in the *Chronicle* as *Bed-anheaf* ('the head stronghold?'), and the scene of a battle in 675 between the kings of Mercia and Wessex. To this battle there may be a reference in the later name *Bedwin*, 'win' meaning battle or victory in old English. Some Roman remains were discovered in the neighbourhood in the end of last century, proving that B. had an existence even before the English came to the island, though neither its Roman nor British name has come down. St Mary's Church, built at different dates and in different styles, and not completed till about 1312, has some ancient and interesting monuments. Jane Seymour, and Dr Willis, one of the first Fellows of the Royal Society, were natives of B. Pop. (1871) 2068.

Bees, a family of insects included in the order *Hymenoptera*, of the Holometabolic ('complete metamorphosis') section of the insect class. These insects possess four membranous wings, the nervures or supporting ribs of the wings being few in number and not prominently marked. The mouth in bees exhibits a combination of the suctorial with the masticatory form of oral



Bees

apparatus. Thus the labrum or upper lip, and the mandibles or larger pair of jaws, are well developed, whilst the maxillæ or lesser pair of jaws are elongated to form a tubular organ through which, together with the tongue, the flower-juices may be sucked up. The labium or lower lip also exists in an elongated form, and the palpi or organs of touch with which the labium is provided are also lengthened to form a protective apparatus. The mandibles or larger jaws are thus employed by the bees in the execution of the multifarious tasks connected with the construction of their abodes, whilst the suctorial portion of the mouth is devoted to the reception and prehension of nourishment. The

four wings can be joined together during flight by means of hooked processes, the hinder pair of wings being the smaller pair. The abdomen of the females is provided with a defensive or offensive apparatus, forming in other insects an ovipositor or egg-depositing organ, but known in the bees, &c., as the *aculeus* or 'sting.' This consists of a pointed process enclosed within a sheath-like structure. A poisonous or irritating fluid is furnished by a glandular structure placed at the base of the sting, and the injection of this fluid into the wound causes the well-known and painful effects of the B.'s attack.

The basal or first joint of the tarsi of the hinder pair of legs in the working-bees or neuters is enlarged and flattened in the typical bees, and may be furnished with bristles—this structure adapting these members for conveying the pollen of flowers. The food of adult bees consists of saccharine and flower juices, whilst the larvæ are fed upon a paste known as 'B. bread,' and which is composed of the pollen of flowers mixed with honey. It is notable that a difference in the food on which the larvæ are fed appears to influence the development of the *sex* in young bees. Thus, ordinary food, composed of honey and pollen, produces 'workers'; whilst larvæ fed on a special paste termed 'royal food' are said to be transformed into 'queens' or 'fertile females.' Landois states that an insufficient or scanty dietary produces male bees from larvæ, a more generous food-supply producing females. Bees, undoubtedly, with many other insects, play an important part in the fertilisation of many flowers, the pollen of one plant being carried by the bees to impregnate other plants. In their distribution, bees occur in all the temperate and warm regions of the world. Very many species are known—over 200 species being found in Britain alone. The bees, as will presently be noticed, are divided by their structural differences into several distinct genera and groups.

In their reproduction, bees exhibit many interesting phenomena. The 'social' bees, or those which, like the ants, live in communities, exemplify these phenomena in their most typical aspects. A social B.-community consists of three kinds of individuals—*drones*, or males; *females*, and *neuters*, or workers. A single female only—the *queen B.*—exists in each community. The impregnation of the queen is effected in summer, at which season only the drones or males are developed. The queen takes her 'nuptial flight' into the air, and is there impregnated by sexual union with the males. The latter are destroyed thereafter by the workers, as being of no further use in the economy of the hive, which is thus for the greater part of the year tenanted by the single queen, the neuters, and the larvæ. The seminal fluid, or impregnating matter received from the males, is contained within the body of the queen in a special sac or receptacle, termed the *seminal receptacle*. This sac communicates by a special duct or tube with the oviduct, along which the eggs pass from the ovary where they are formed, to be deposited. This communication between the oviduct and the seminal receptacle can be opened or shut at will; and it has been definitely ascertained that those eggs from which *females* or queens are to be developed, are allowed to come in contact with the fluid of the male; while those eggs which are to give origin to male bees or drones are allowed to pass from the queen's body without any such contact. This curious phenomena appears, therefore, to constitute a case of *Parthenogenesis* (q. v.), or of that anomalous process seen also in other insects (see APHIS), by which the eggs of a female can thus develop into new beings without being fertilised by the male animal. The larvæ which are to produce *females* or queens, as already stated, are fed on royal food, the males being fed on ordinary nutriment. The eggs which are thus to develop queens, are further deposited after those which are to produce males and workers, and are placed in cells of special construction known as 'royal cells'; and the cells containing the larvæ, which are to become male bees are larger than those containing eggs which are to produce simple workers or neuters.

What is known as the *swarming*, consists in the departure from a parent hive of a large body of workers, accompanied by a young queen B. This offshoot from the colony, determined probably by its increase in too great numbers, is destined to found a new community, and contains therefore the necessary sexual elements for that end. The *queens*, or *fertile females*, possess fully-developed reproductive organs, and in this way represent the truly sexual-part of an ordinary community. They are of larger size than the other individuals. The under parts of the body are of a yellower colour than in the *drones* or neuters, and

the wings are shorter than in the latter forms. The queens do not possess wax-sacs or pollen-baskets. The legs of the queens are not so fully provided with hairs, and the mandibles are notched or indented, whilst the sting is curved. The *drones* or *males* are larger in turn than the neuters. Their eyes are of large size, and the antennæ or feelers are slightly larger than in the workers. The latter possess bodies averaging about $\frac{1}{2}$ an inch in length. The antennæ are 12-jointed, and end in a knob-like process. The abdomen consists of six joints; the four middle segments bearing the wax receptacles, whilst they carry pollen, as already explained, on the basal joint of the hinder pair of legs.

Concerning the number of individuals contained within each B.-community, no exact estimate can be furnished, the number being subject to much variation at different seasons. The total number of bees in an ordinary hive has been said to vary from 10,000, or 15,000, to 30,000, or even 60,000. And of these numbers, from 600 to 2000 may be males, the rest being neuters, only one female or queen being found within the colony in ordinary circumstances. The queen is said to deposit eggs at an average rate of 200 or 300 per day, although this number may be greatly exceeded. The queen is also said to live for three years or more; the average life of the neuters extending to about a year. The neuters, it is to be noted, are simply *sexless* individuals, most probably females, in which the generative organs are undeveloped. On the workers, or ordinary bees, all the labour of the hive devolves; and they not only construct the abode, but tend and feed the young, and otherwise wholly devote themselves to the care of the colony. The bees undergo a perfect metamorphosis—that is, the young first appear as *larvæ*, or grubs, then change to *pupa*, and finally, developing wings, become the *imagos*, or perfect insects.

The *honey secretion*, for which the bees are famed, consists of the flower-juices drawn from the flower-receptacles by the B.'s proboscis, and elaborated within the *honey-bag*, which forms in fact a part of the digestive system, corresponding to a crop or first stomach. From this receptacle the honey is rejected, and is stored up in cells, or is used to feed the larvæ, as already mentioned.

The bees have been divided into the family or section *Andrenidae*, and into that of the *Apidae*—this latter including the ordinary social bees. The *Andrenidae* are distinguished by possessing a short trunk with an obtuse blunted apex; the *ligula* or basal portion of the lower lip forming the proboscis in this group. The hinder legs do not carry pollen. These are solitary bees. They inhabit burrows which they excavate in the ground, or which they cut out of wood, &c., the eggs being deposited among masses of pollen and honey. Males and perfect females only appear to be developed in this section, no neuters being found. This group includes various genera of bees, among which *Colletes* is a familiar form. The better-known *Apidae* generally live in communities, and possess a mouth of the structure described at the commencement of this article. Various genera, differing in form and habits, are included in this group. Some of the best-known of these are solitary in habits. Familiar examples include the carpenter-bees (*Xylocopa*), which excavate cells and nests in wood; the mason-bees (*Osmia* and *Megachile*), which form nests of particles of sand, &c.; the upholsterer-bees (e.g., *Apis papaveris*, &c.) or leaf-cutters, which line their nests with leaves and plant-tissues, &c. The latter bees are so named from their habit of cutting the leaf-tissues of plants, and of forming and lining their nests with these tissues. The sharp mandibles or larger jaws furnish the means of carrying on their operations.

The humble-bees (*Bombi*) are social in habits, and possess males, females, and neuters in their colonies; the females, however, numbering more than in the hive-bees, taking part in the duties of the hive. Two kinds of females, in fact, are found in the colonies of the humble-bees—larger egg-producing females, and smaller ones, which assist in the labours of the hive, and which are believed to produce male eggs only. These



Upholsterer-Bee.

bees resemble the wasps, in that the continuation of the species is dependent upon the impregnated females, which lie torpid throughout the winter, and lay impregnated eggs in the succeeding spring; the other and greater portion of the colony being killed by the winter's cold of each year. A colony of humble bees numbers from 60 to 200 members. They are of larger size than the hive-bees, and possess hairy bodies, coloured generally black with bright orange bands.

The hive-bees (*Apis mellifica*) are the most familiar and typical of the species. Many varieties or breeds of this one species, as well as several distinct species of the genus *Apis*, exist. These bees chiefly inhabit the warm and temperate regions of the E. hemisphere, although they have become acclimatised in America also. In Egypt the *A. fasciata* is the most common species, and in Greece the *A. Ligustica* occupies a similar position. *A. unicolor* occurs in Madagascar; *A. Indica* in India; and *A. Adansonii* in Senegal. A genus *Melipona* occurs in S. America, and presents species nearly allied to the *Apis*.

The science of B.-culture, and the economy and functions of the hive, form subjects demanding an extended notice, and such breadth of treatment as can most satisfactorily be given in special treatises on the subject, whilst further details regarding the organisation of bees as related to insect structure in general will be found in the article on INSECTS (q. v.). The parasites that infest bees are noticed under the head of B.-PARASITE, whilst information concerning HONEY, WAX, &c., will be found in the articles devoted to these subjects.

Beech, a genus of trees (*Fagus*) of the N. O. *Cupuliferæ* (q. v.), containing few species, all of which are beautiful forest trees. The common B. (*F. sylvatica*) forms extensive forests in some portions of Europe, such as the island of Seeland, in Denmark, and more particularly in the vicinity of Copenhagen, and is also a native of some parts of Asia. It will often attain a height of from 100 to 120 feet and a diameter of 4 feet. Its wood, though hard and solid, is too brittle for the purposes of the carpenter, but it is very durable under water, hence is employed in making mill-sluices. In France, Denmark, and other countries, it is extensively employed for making sabots or wooden shoes, and it is considered the best firewood. The ashes yield much potash, and vinegar is prepared from the shavings. B.-mast (the seeds and fruit-coat) is used for feeding cattle, and in France for the purpose of obtaining *B.-oil*, a bland fixed oil which is used for food, lamps, &c. B.-mast is also used for adulterating cocoa. The red-leaved variety of the B., now so common in woods, is said to have sprung from a single twig which was accidentally found in a German forest. The American *F. ferruginea* (the fruits of which are caten) has leaves naturally of the same colour. Among the other species of B. may be mentioned *F. Forsteri* of the Tasmanian mountains and of Tierra del Fuego; *F. antarctica* of the Straits of Magellan, and *F. procera* of the Andes of Chili. This, with the two preceding species, would form beautiful ornamental trees in our parks and forests. The genus is also represented in the mountains of Java and of Southern New Zealand.

Beech Drops. See CANCER ROOT.

Beecher, the name of an American family, several members of which have attained considerable distinction in various ways.—1. The **Rev. Lyman B., D.D.**, born at Newhaven, Connecticut, October 1775, studied under Dr Dwight, and settled as minister in East Hampton, Long Island, in 1798. For some years he was minister of the Congregational Church, Litchfield, Connecticut, and in 1826 was called to Boston, to stem the current of Unitarianism. In 1832 he was appointed President of Lane Theological Seminary, Cincinnati, and he also took charge of the second Presbyterian Church there. Soon after he was tried for heresy, and his case helped to divide the Presbyterian Church into 'Old' and 'New' School. He returned to Boston in 1842, and died at Brooklyn in 1863. B. was one of the great lights of New England in his day, and was distinguished as a pulpit orator, advocating New School theology, or moderate Calvinism, temperance and anti-slavery. He had six sons in the ministry (*Autobiography and Correspondence*, 2 vols. New York, 1864).—2. **Catherine Esther B.**, daughter of L. B., was born September 6, 1800. She has devoted herself to the cause of education, was Principal of a female seminary in Hartford from 1822 to 1832, and afterwards filled a similar position in Cincinnati. She has written much on

Philosophy, Physiology, and Theology, with a view especially to the higher culture of her own sex.—3. **Rev. Charles B.**, son of L. B., was born at Litchfield, 1815. He was a minister in Newark, New Jersey, and afterwards in Georgetown, Mass., where he was tried for heresy. He travelled in Europe with his sister, Mrs Stowe, wrote part of her *Sunny Memories*, edited the *Life* of his father, Dr Lyman B., and is the author of various other works, which do not require mention.—4. **Edward B.**, son of L. B., born at East Hampton, L.I., in 1804, graduated at Yale College in 1822, and studied divinity there and at Andover. He was pastor of Park Street Congregational Church, Boston, 1826-31, and afterwards President of Illinois College. One of his books, *The Conflict of Ages*, made some stir in America when it came out.—5. **Rev. Henry Ward B.**, son of L. B., was born at Litchfield, Conn., June 24, 1813. He graduated at Amherst College, Mass., in 1834, and settled at Laurenceburgh, Indiana, in 1837, whence he removed to the Presbyterian Church, Indianapolis, in 1839, and to the Congregational Church, Brooklyn, in 1847, where he still officiates. When he came to Brooklyn, he soon made a national reputation by a style of preaching peculiar to himself. It was distinguished by poetical description, emotional sentiment, sympathetic knowledge of human nature, and censure of moral and public wrong; and it was also relieved or disfigured by dubious strokes of humour. B. has also devoted much time to editing and lecturing, besides attending to his farm at Peckskill on the Hudson. In 1874 his former protégé and friend, Theodore Tilton, brought a criminal charge against him, in reference to his wife, Mrs Elizabeth R. Tilton. The trial lasted from January 4 to July 2, 1875, but the jury were unable to agree, and no verdict was returned. B. has written *Norwood*, a novel, and the *Life of Christ*.—6. **Harriet Elizabeth B. Stowe**, daughter of L. B., and wife of Professor Calvin E. Stowe, was born at Litchfield, June 15, 1812. She was a teacher in Hartford; married in 1836 to Rev. C. E. Stowe, Professor in Lane Seminary, Ohio. Her early literary efforts were confined to stories in the *Mayflower* and Sunday-school books. In 1850 her husband removed to a professorship in Bowdoin College, Maine, and in the following year she began *Uncle Tom's Cabin* as a serial tale in the *National Era*, Washington. After some difficulty in finding a publisher, it was brought out in book form in Boston in 1852. In three and a half years 313,000 copies were sold in the United States, and in all, a million copies have been sold there, and it has been translated into twenty languages. In 1853 Mrs Stowe travelled in Europe, and on her return published *Sunny Memories*. She afterwards wrote *Dred*, a slave story, which was on the whole reckoned a failure. She was, however, again successful in the *Minister's Wooing*, 1859, a work which contains some of her best character-painting. In 1869 Mrs Stowe brought out what she chose to consider the *True Story of Lady Byron's Life*, which made a sensation on both sides of the Atlantic, but has not added to her reputation, at least in England. Her recent writings treat mainly of New England life.

Beechey, Sir William, B.A., a portrait-painter of great reputation in his own day, was born at Burford, Oxfordshire, December 12, 1753. He became a student in the Royal Academy in 1772; was made an Associate, and portrait-painter to Queen Charlotte, in 1793; was knighted by the king, and elected a Royal Academician, in 1798, for his equestrian picture of George III., the Prince of Wales, and the Duke of York reviewing the 3d and 10th Dragoons. Henceforth till 1836, when he retired from his profession, he was the favourite limner of the aristocracy. Among others, he painted Lord Nelson, Lord St Vincent, Lord Cornwallis, John Kemble, and Mrs Siddons. B. died at Hampstead, 28th January 1839.

Beechey, Frederick William, an English admiral and Arctic explorer, son of the preceding, was born in London, 17th February 1796, and entered the navy at ten years of age. In 1818 he was appointed to the *Trent* under Franklin, whom he accompanied in his search for the N.W. Passage; and for his excellent drawings of objects in natural history received a parliamentary grant of £200. In 1819 he joined the *Hula* and took part in another Arctic expedition under Lieutenant, afterwards Sir Edward Parry. In 1821, in the *Adventurer*, under Captain Smith, he surveyed the coast of N. Africa, and rendered special service by his examination of the Greek antiquities of Cyrenaica, of which he published a description, together with a narrative of

the expedition, in 1828. In 1825 B. was appointed to the *Blissom*, and sailed for the Polar Sea by way of Behring's Strait, to communicate with Franklin, who was to make the attempt overland from N. America; but returned in 1828, without accomplishing his object, though the expedition rendered important services to geographical science by his discoveries of harbours and channels. In less than three years he sailed 70,000 miles. His *Narrative* was published in 1831. In 1847 B. was requested by Government to create and superintend a marine department of the Board of Trade, in which office he remained till his death. He was made Rear-Admiral of the Blue in 1854, President of the Royal Geographical Society in 1855, and died 29th November 1856.

Beechworth, a town in Victoria, 185 miles N.E. of Melbourne. It is the chief centre of population on the Ovens (q. v.) goldfield, and is a thriving place. Pop. 3167; of the shire, 6222. The mining plant in the B. district was valued in January 1874 at £50,160. Oxide of tin is found throughout the district, and is worked to some extent.

Bee'der, properly **Bidar**, capital of a district of the same name in the feudatory state of the Nizam of Hyderabad, on the right bank of the Manjira, an affluent of the Godavary, 75 miles N.W. of Hyderabad. It was at one time a flourishing town, but has fallen off of late years. Three-fourths of the population are Hindus, and the remainder Mohammedans. B. has some manufactures in an alloy of one part of copper to twenty-four of tin. Pop. 20,000.

Bee-Eater, a genus of birds belonging to the Fissirostral section of the Insectores or Perchers, and forming the type of the family *Meropidae*. The bill is elongated and curved. The nostrils are partly hidden by short bristles. The wings are long



Bee-Eater.

and pointed, the tail being broad and long, and having the two middle feathers longer than the rest. The toes are also of large size, and the two lateral toes are united more or less completely to the middle digit. These birds are confined to the Old World. The common or European B.-E. (*Merops apiaster*) is rare in Britain. It occurs in Russia and in the S. of Europe, although its native region is Africa. It is about 11 inches in length, and is coloured brownish-red and yellow on the upper parts, the forehead being pale-blue. The head possesses a black streak on each side behind the eye, and a black band also crosses the throat, which is bright yellow underneath. The lower parts, wings, and tail are coloured green. *Merops viridis* is a familiar Indian species. They all feed upon insects, which they dexterously capture on the wing. They appear to be social in habits, like the swallows; the nests being excavated in banks.

Beef. See **FOOD**.

Beef-Eater, a corruption of the French *buffetier*, an officer who attended the buffet or sideboard. The term is popularly applied to the Yeomen of the Guard, some of whom, since the time of Henry VII., have been stationed at the table at royal banquets, and attended the sovereign on solemn festivals.

Beef-Eater, or **Ox-Pecker** (*Buphaga*), a genus of Insectorial or Perching birds, belonging to the section *Coniostres*, and so named from their habit of alighting on the backs of oxen, buffaloes, camels, &c., and of extracting therefrom the larvae of the *Cesridæ* or 'Bot-flies', which infest cattle, &c. The common B.-E. (*Buphaga africana*) averages about 8 or 9 inches in length, and is coloured reddish-brown above and yellowish-white in the under parts. The bill is yellow, the legs brown, and the tip of the beak red. These birds exclusively inhabit the warmer regions of Africa. The cattle are said to rise when the birds fly off or are disturbed.

Beef-Tea, a preparation from lean beef or other meat of great value for invalids and delicate persons, made by mincing the flesh small, mixing it weight for weight in water, and slowly heating up to the boiling point. The juice is then strained off and seasoned for eating. A more nutritive extract can be obtained by treating minced raw meat with distilled water acidulated with hydrochloric acid and a little salt; the proportions being $\frac{1}{2}$ lb. of meat, 14 oz. of water, and 12 or 18 grains of salt. After digesting for an hour, the liquor should be strained off and the residue washed with 5 oz. of water, and thus about 1 pint of excellent extract is secured. See also **EXTRACT OF MEAT**.

Beefwood. See **CASUARINA**.

Beehive-House, in archæological nomenclature, denotes a rude, primitive dwelling, of which traces are abundantly found in Scotland and Ireland. A B.-H. is circular in plan, and its thick dry-stone walls converge as they rise, and give it a conical appearance, and at the apex a small opening is left for light and ventilation. Their antiquity is unknown; Lubbock supposes that some of them belong to the Stone Age, but there are instances of very recent occupation of such dwellings. A group of them on the shores of Loch Resort in Lewis was tenanted so late as 1823, and to this day they are sometimes used as summer shielings by the inhabitants of the Hebrides and Skye. Their modern occupants know nothing of their origin.

Beelzebub (Heb. *Fly-Baal*) was worshipped by the Philistines at Ekron. The origin of this worship is probably to be sought in the scourge of flies to which the hot plain of Philistia has always been subject. It was Baal who sent it; it was Baal who could remove or mitigate it; hence his name of *Fly-Baal*. The name **BEELZEBUL**, applied in the New Testament to the prince of the demons (Matt. xii. 25), has probably no connection with B. *Zebul* in the Talmud means—(1) dung; (2) an idol, an abomination. Now with the Jews all idols or false gods were demons; hence probably the name Beel-Zebul given in the Talmud to Asmodeus, as if head of idolatry. But many other conflicting explanations are given.

Bee-Parasite, the name given to the *Stylops*, a curious insect, distinguished by possessing twisted filaments in place of the front pair of wings, and forming of itself the sole example of the order *Strepsiptera*. The males alone are winged as above described, the females existing as soft maggot-like creatures, which live within the bodies of bees and wasps, and protrude their heads from between the abdominal segments of the infested animals. The young or larvae are hatched within the body of the female, the young males developing wings and living a free existence, whilst the females pass from the body of their parent, and seek fresh hosts wherein to reside. *Stylops Dalii* and *S. Spencii* are familiar species.

Beer (Ger. *bier*) and **Brewing**, the fermented infusion of malted grain, or of any substance containing sugar or starch; and the art of making it, which is of great antiquity. The Egyptians were acquainted with it; 'wine of barley' is frequently mentioned in early Greek writings; and there is abundant evidence that the Romans prepared B. from wheat, barley, and other cereals. Tacitus, speaking of the customs of the Germanic tribes, refers to their great love of B., a disposition, by the way, which is not wanting in their modern descendants. The Gauls, Britons, and Scandinavians used B. on all festive occasions, and offered libations of it to their gods. At the present day, while B. is in almost universal use, the substances from which it is prepared, and the mode of preparation, vary with different nations or tribes. Maize furnishes some S. American tribes with a fermented liquor called *chica*; the Russians prepare a thick, muddy kind of B., which they call *kvass* or *quass*, from a decoction of rye-flour; from millet and kindred grain the Crim Tartars and many African tribes obtain alcoholic drinks; and an infusion of rice is of equal utility to Eastern Asiatics. Fermented mare's milk forms the *koumiss* or *kumiz* of the Central Asian tribes, the *leben* of the Arabs is a similar product, and from a species of pepper plant the Polynesians, by a preliminary process of mastication, prepare their *Ava*. Barley is the material principally operated on in Great Britain.

In the manufacture of beer there are two distinct stages: (1) the preparation of malt from the raw grain, called *malting*; and (2) the formation of a fermented liquor from the malt, termed *brewing*. In the process of *malting* there are four operations, steeping, couching, flooring, and kiln-drying; the first three are concerned with the germination of the grain, and when this is sufficiently advanced, it is checked by the application of heat. *Steeping* consists in placing barley into a large cistern, and covering it with water to the depth of some inches; the grain absorbs a portion of the water, and becomes swollen and soft, and after steeping for forty or sixty hours, the superfluous liquid is drained off. *Couching*.—The grain is next thrown into a heap or couch on the floor, and allowed to lie for twenty-four hours, during which time the barley rises in temperature, absorbs oxygen, and gives off carbonic acid. With the increased heat the couch parts with a portion of its moisture, a process technically called *sweating*, and germination is induced, evidence of which is afforded by the presence of rootlets or fibrils of the radicle, and an incipient plumula or stem, the *acrospire* of the maltster. *Flooring*.—In this operation the barley is spread over the floor to the depth of twelve to sixteen inches, in order to further the growth to a certain point; and to prevent unequal heating and too rapid growth, the grain is lifted with spades from time to time, and scattered over a wider area till its depth is not more than four inches. From fourteen to twenty-one days, according to the temperature of the couch, are occupied in this operation, and when the acrospire has reached the length of the seed, it is necessary to check further germination. This is accomplished in *kiln-drying*, by spreading the grain, usually to a thickness of four inches, over the kiln-floor, which is perforated with innumerable small holes to admit of the passage of heat from a fire below; while drying, the grain is frequently turned over. According to the temperature of the kiln and the management of the drying process, the malt acquires distinguishing colours, being either pale, amber, brown, or black, the highest temperature producing the latter. The pale and amber varieties, produced by a heat of 90° to 100° F., are used in the manufacture of light beers; the brown, dried at from 150° to 170°, is used for sweet ale; and the black, prepared by roasting in cylinders, heated to 360°–400°, for Porter (q. v.). Good malt should be lighter than water, full, plump, and unshrivelled, crisp and easily broken between the teeth, disclosing a soft floury kernel with a sweet taste and agreeable flavour; the plumula should also extend two-thirds of the length of the grain. Malt, though greater in bulk by $\frac{1}{10}$ to $\frac{1}{5}$, is lighter by $\frac{1}{3}$ than raw grain—that is to say, 100 parts raw grain yield only 80 parts malt, an apparent loss of 20 per cent. Raw grain, however, on being dried, parts with the water present in it, about 12 per cent.; this leaves the real loss of material in conversion from raw grain to malt as 8 per cent., including 3 per cent. of rootlets or *comings*, which drop off in drying, and are removed by a wire screen. During the malting process a remarkable change is effected in the substance of the grain. The glutinous or albuminous constituents of the grain in great part break up and disappear, passing partly, it is supposed, into rootlets, producing also in the body of the seed a peculiar nitrogenous substance called *diastase*, which reacts on the starch of the grain, and converts part of it into soluble dextrin and grape-sugar. Dr Thomson gives the following comparative analyses of barley and malt, taking 100 parts of each:—

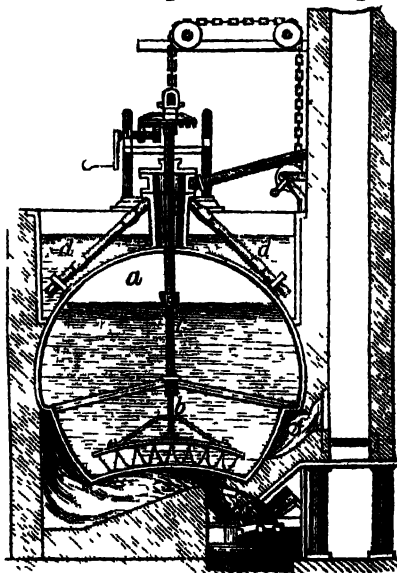
	Barley.	Malt.
Starch,	88	69
Sugar,	4	16
Gluten,	3	1
Gum,	5	14
	100	100

Brewing, the second stage in the manufacture of beer, embraces six distinct operations, namely, crushing the malt, mashing or infusing with hot water, boiling the wort with hops, cooling, fermenting, cleansing, and storing.

Crushing the malt is sometimes done by grinding it like oatmeal between circular stones, but a newer and preferable mode is to pass the malt between iron cylinders, the space between which is so regulated as to crush and not to pulverise the malt.

Mashing.—This is a most important operation, for on it depends to a great degree the character of the B. It is conducted in a large vessel called a mashing-tun, in which the

malt is thoroughly mixed with hot water to facilitate the conversion of the remaining starch into grape-sugar by the soluble diastase, the whole saccharine matter dissolving to form *mash wort*. The mashing-tun is formed of wooden staves firmly hooped together, and the malt, passing from a hopper above by means of the shoots, is led into the tun through the feeder and its trunk-like appendage. Hot water of the proper temperature being run in upon the malt, the whole is thoroughly mixed by means of strong wooden rakes fixed to an iron shaft, which rotates on its axis, and also revolves round the tun. At the bottom of the tun are several pipes to convey the wort into a vessel called the *'underback'*, and also a false bottom perforated with a number of small holes. After mashing, the tun is covered up for two hours to allow the wort to clarify by the settling of the malt, after which the liquor is drained off into the underback. The unexhausted malt or *'goods'* remaining after the first mash is again treated with water at a slightly higher temperature, and, after settling, this second mash is drawn off and mixed with the first. Sometimes the operation is repeated a third time to exhaust the saccharine matter of the malt. The temperature which gives the best extract of malt is the range between 158° and 167° F., and therefore, in mashing, it is usual to begin with water at the lowest of these heats (the tun having previously been scalded with hot water), and to conclude with the highest. It is also better to employ the water in three separate portions; the first dissolves the more soluble ingredients, and brings the dissolved starch into intimate contact with the diastase and free sugar; the second and third portions remove the remaining starch, and extract all the available products. The first and second mashes are used for superior beer, and the third is used for small beer, or for the first mash of new malt. The exhausted grains or *draff* left in the mashing-tun is used for feeding cattle. In brewing the



different kinds of beer, it is essential that the wort be maintained of a definite strength; and to ascertain the amount of saccharine matter present the brewer employs an instrument called a saccharometer, a form of hydrometer (q. v.), then, if necessary, he mixes the wort of the different mashes till the required density is obtained. *Boiling the wort with hops*.—The wort is transferred as quickly as possible from the underback into the copper *a*, to be boiled with hops. The object of boiling the wort is to coagulate the remaining albuminous matter, which is apt to cause putrid fermentation, to concentrate the wort, and convert any residuary starch into sugar or dextrin, but chiefly to extract from the hops certain constituents—a volatile oil, a bitter resinous principle called *isupulin*, and tannin—which preserve the beer, and impart to it an agreeable flavour. The quantity of hops added to the wort varies with the kind of beer being produced, the season of the year, the length of time the beer is to be preserved, and the climate for which it is destined. Export beer is always more richly hopped than that for home consumption, and cold-weather produce less so than beer brewed in warm weather. For each quarter of malt 4½ lbs. of hops are required in ordinary beer, for superior ales 8 lbs. are employed, and as high as from 14 lbs. to 20 lbs. for export beer. Boiling with hops is continued for from one to three hours, during which time the wort clears by the coagulation and subsidence of the nitrogenous matter; and to prevent the

hops adhering to the bottom of the copper and charring; the iron shaft *d*, fitted at the bottom end with cross arms with pendant chains, called a *rotter*, is kept rotating. The cistern above the copper contains water, for the purpose of condensing the steam and the volatile oil of the hops that escape through the pipe *c*, and are forced down four pipes (two of which, *d*, are shown) into the water, which is used in the next mashing. The boiling completed, the whole contents of the copper are drawn off into the *hop-back*, a large square cistern of wood or iron, with a false bottom, perforated with minute holes. The hops and matter in suspension are allowed to settle, and the liquor is then strained off into the coolers to the depth of 2 or 3 inches.

Cooling the wort.—The coolers are shallow vessels of wood or iron, with a slight inclination towards one end, where the fermenting tuns are placed. There is an exposure on all sides to currents of air; and to expedite the work horizontal fans are caused to revolve rapidly, creating a powerful draught over the surface of the liquor, for it is essential to cool quickly to prevent acidity in the wort, termed *foxing*. An improved method of rapid cooling is often practised: by it the wort is conveyed through long tinued iron pipes placed in a stream of cold water, and the tendency to foxing is greatly diminished.

Fermenting the wort.—This constitutes the most important and most critical operation in brewing, and it is one that calls for constant attention and special skill. At a temperature ranging from 54° to 64° F. the wort is introduced into the fermenting tuns, which are either square or circular, of wood or iron; and from 1 to 1½ per cent. of Yeast (q. v.) is added, either all at once or in two separate portions. Among other things, the quantity of yeast is regulated by its quality, on which, to a great extent, depends the success of the fermentation. Much heat is developed during the fermenting process, and as a temperature of 95° F. is favourable to acetic fermentation, great care is necessary to guard against the liquid heating so high; and in most breweries a simple apparatus, consisting of a coil of metallic tubing through which cold water circulates, is placed in the tun to keep down the temperature. In the manufacture of the finer pale ales, 72° F. is never exceeded in the fermenting tuns—a temperature which ensures the retention of the delicate flavour of the hops. The appearance of small bubbles of gas at the sides of the tun is the first indication that fermentation has begun, and these bubbles are gradually displaced by others and driven towards the centre of the cistern. As the action becomes more energetic a greater quantity of carbonic acid gas is liberated, and the froth, which by this time has collected on the surface of the liquid, swells and breaks up into *rocks*; then the mass, as yet colourless, gradually assumes a yellow or brownish-yellow colour—the former colour indicating a superior quality of beer to the latter. Soon thereafter the fermentative action lags, and the head is skimmed off before it subsides. In what way the yeast acts is still obscure, but its province is to set up a *vinous Fermentation* (q. v.): that is, the grape-sugar is converted into alcohol and carbonic dioxide—each molecule of grape-sugar splitting up into two parts of alcohol and two parts of carbonic dioxide—thus:



This conversion is attended with *attenuation*, or a diminished density of the liquid, and by means of his saccharometer the brewer can ascertain when the required degree of attenuation is attained. The fermentation is seldom allowed to run its full course, for, when the proper strength is attained, the yeast is separated and the liquor drawn off into casks, where a slow and almost insensible fermentation takes place owing to some particles of the ferment remaining suspended in the beer.

Cleansing and storing.—Each of the casks or cleansing vessels is provided with an orifice on the upper surface, and as the yeast rises to the bung-hole, it is carried over into a trough. After the beer is thoroughly clarified it is racked off into large store-vats, or into barrels to be sent to the consumers. Frequently *finings*, as gelatin or isinglass dissolved in sour beer, are employed to assist the clarification by precipitating suspended matter. The saline ingredients in water materially assist brewing operations, and in particular lime plays an important part in clarifying beer.

The amount of alcohol in the different kinds of beer varies considerably, and is in proportion to the degree of attenuation. Ales, sweet and mild, for home consumption, possess more body, or are richer in malt extract, and consequently poorer in alcohol than bitter beer or ales for export. Professor Brand found that the amount of alcohol in strong ales averaged between 6 and 7 per cent.; in brown stout, a strong kind of porter, from 6 to 7 per cent.; and in London porter, 4 per cent. Burton ale, according to the same authority, yields 8 to 9; Edinburgh ale, 6 to 7; and Dorchester ale, 5 to 6 per cent.

In respect to adulteration of beer, the law allows nothing but malt and hops to be used in brewing, except burnt sugar as a colouring agent in porter; and the brewers of the present time are a law-abiding class compared with their predecessors of fifty years ago. The adulterants of that period—for instance, quassia, wormwood, ginger, &c., to give bitterness and pungency, sulphate of iron, alum, salt, and molasses, to impart a head—are now seldom if ever used; but picric acid and *cocculus indicus* are sometimes added with hops to increase the bitterness; both substances are highly objectionable, the latter specially so, as it is poisonous.

Beer Acts. By 32 and 33 Vict. cap. 27, and subsequent amended Act, no license nor renewal for the sale of beer, cider, or wine can now be granted, except upon the production of a certificate granted under the Act. Every one intending to apply to the justices for a certificate under the Act is to give notice in writing, at least twenty-one days before he applies, of his intention to one of the overseers of his parish. Penalties were under this Act imposed upon all the ordinary offences committed by the keepers of beer-houses; but the Act not proving adequately stringent, its provisions were largely supplemented by the Licensing Act of 1872. Provisions for the granting or renewing of licenses are amplified and made more stringent. Regulations are made for the closing of premises, with special regulations for London. Severe penalties are imposed upon illicit sales, and upon adulteration of liquor, and on those who knowingly sell adulterated liquor. Any one permitting drunkenness upon his premises is liable to a fine of £10 for the first offence, and of £20 for the second. Any one who permits gaming or betting in his house is liable to a penalty of £10 for the first offence, and of £20 for subsequent offences. Nothing in the Act is to apply to privileges enjoyed by any university in England.

This Licensing Act of 1872 does not apply to Scotland, where the sale of liquor and the regulation of hotels is under the Act known as the *Forbes Mackenzie Act*. No liquor or refreshment of any kind is allowed to be sold under this license on Sunday, at any hotel, inn, shop, or public-house, except to those resident on the premises, or to travellers. It has generally been held by magistrates that to be a *bona fide* traveller, the applicant for beer, or other refreshment, must have come from a distance of seven miles.

Beebeern. See GREENHEART.

Beerbhoom, an executive district of the division of Burdwan, province of Bengal, British India, with an area of 1344, and a pop. (1872) of 695,921. It contains 2471 villages, but the only place of any size is Soory, which has a pop. (1872) of 9001.

Beer-Money. From the year 1800 till 1873, the non-commissioned officers and privates of the British army received a penny a day, while on home-service, in lieu of an issue of beer and spirits. This allowance, called B.-M., is now incorporated with their ordinary pay. *Pour-boire*, in France, and *Trink-geld*, in Germany, each the equivalent of B.-M., are not applied to allowances to soldiers, but to gratuities given to servants, &c.

Beer-she'ba (Heb. 'the well of the oath,' or 'of seven'; modern, *Bir-es-Saba*), the place on the southern borders of Canaan where Abraham made a covenant with Abimelech, King of the Philistines (Gen. xxi. 22-32, and another account xxvi. 31-33). It was always spoken of as the southern limit of the kingdom, and its position on the road to Egypt rendered it a place of importance, which it continued to be under the Romans and down to the time of the Crusades. All that remains of it now is a heap of ruins, near which are two larger and five smaller wells.

Beesha, a genus of grasses, natives of the E. Indies, remarkable for the fleshy pericarp or wall of the fruit, which surrounds the seeds like a berry.

Bees'wax, a hard solid fatty substance secreted by bees, and employed by them to form the cell-walls of honeycombs. That wax is a substance truly elaborated within the animal body, and not merely collected from plants, as has been supposed, is demonstrated by the fact that bees entirely fed on sugar yet produce wax. In its natural condition it is a dull yellow unctuous body, possessing a slight sweetish odour. It is bleached or whitened for use by cutting it into thin slices and exposing it to the influences of light and moisture, or by treating it with dilute nitric acid. It can also be bleached with chlorine, but, as it takes up traces of this substance, such a method of treatment is objectionable for many purposes. Purified wax contains three chemical principles—myricin, cerin, and cerolein. Myricin forms about two-thirds of the entire composition, and is insoluble in alcohol; cerin or cerotic acid is soluble in boiling alcohol; and cerolein, to which the odour and tenacity of wax is due, is soluble in cold alcohol. Wax is chiefly used in the manufacture of candles, and, notwithstanding the variety and excellence of other illuminating fats now available, wax-candles are still consumed in enormous quantities, chiefly in the Roman Catholic and Greek Churches. It is also largely employed in modelling perishable fruits and flowers for the purposes of instruction and for ornament. It is likewise useful in surgery, and it has many minor applications. Wax is produced very generally throughout the world, but in the tropical forests of America and the East it is found in large quantities, and forms an important article of commerce.

Beet (*Beta*), a genus of plants of the natural order *Chenopodiaceae* (q. v.), few in number, and mostly biennials and natives of the temperate parts of the Old World. The common B. (*B. vulgaris*) is a native of the shores of the Mediterranean, and is now extensively cultivated in Europe and America for its fleshy carrot-shaped roots, as an article of food for man and the domestic animals, and as a source of sugar. The varieties grown for the purpose of obtaining sugar are *Betterave à Sucre* and the white or Sicilian B. (*B. Cicla*), which latter is most esteemed.

In 1868, about 8,000,000 tons of B., yielding 650,000 tons of sugar, was grown in Europe, chiefly in France. In 1875 the yield of sugar in France alone was 440,000 tons, the value of which was £25,000,000. The grated root ('sugar-cake') and the molasses—both refuse products in sugar manufacture—are also useful, the former for feeding cattle, and the latter, when slightly acidulated with sulphuric acid, yielding, on fermentation, from 24 to 30 per cent. of a coarse spirit used to adulterate brandy with. Mangel-wurzel (*B. vulgaris macrorrhiza*), probably only a coarser variety of the common B., is extensively grown as a food for cattle. *B. maritima*, a native of England, is sometimes used as a substitute for spinach or greens, as are also the leaves of *B. Cicla*, especially in early spring. The leaf-stalks and mid-ribs (*chards*) of the latter species are also used as a table-vegetable. It is eaten like sea-kale or asparagus, and is a favourite of the French under the name of *Poirée à Cardé*. The leaves of *B. Bengalensis* likewise furnish a kitchen-vegetable in the E. Indies.

Beet-Fly (*Anthomyia Beta*), a *Dipterous* insect belonging to the *Muscida* or Fly family, and which deposits its eggs in the leaves of mangold-wurzel plants, and of other kinds of beet. The larvæ eat the plant-tissues, and produce *bulla*, or blister-like structures on the leaves. The full-grown B.-F. resembles the common fly in appearance, but is not so large.

Beethoven, Ludwig van, the greatest of musicians, was born at Bonn, 17th December 1770. His father was a tenor singer in the service of the Elector of Cologne, from whose court-organist he received his first lessons, and at the age of fifteen was himself appointed to the same office. In 1792 the Elector sent him to Vienna, where he studied hard successively under Haydn, Schenk, and Albrechtsberger. Except a few brief excursions, B. spent the remainder of his life in this city. He did not hold any musical office, but devoted himself exclusively to composition. At first, indeed, he appeared as a pianoforte-player, but afterwards entirely withdrew from the world, and lived in a solitude that was aggravated latterly by total deafness. He died 26th March 1827.

B. was essentially an instrumental composer. He wrote several

masses, a sacred cantata (the *Mount of Olives*), and one opera (*Fidelio*); but beautiful and original as these are, they show he is not at his best in choral writing. His fine rests upon his instrumental works, and chiefly upon his orchestral symphonies. Of these there are only nine in existence, for B. (although a wonderful *improvisatore*) prepared the works which he intended for publication with great deliberation and care. To that deafness of which mention has already been made have been ascribed the peculiarities and unintelligibility of some of his later compositions, which are assigned to what is generally called his 'third period.' But a musician like B. would know the effect of his scores just as well by looking at them as by hearing them played, and the 'third period' seems to have been simply a convenient limbo to which his critics assigned the works they could not understand. With the growth of musical culture, the works covered by this period (including the wonderful ninth or 'choral' symphony) are becoming better appreciated, because better understood. Of B.'s treatment of the symphony, the greatest of his successors—Richard Wagner—has said:—'B. developed the symphonic work of art to such astonishing breadth of form, and filled this form with such marvellously various and entrancing wealth of melody, that we now stand before it as before a landmark of an entirely new period in the history of art; for in this symphony a phenomenon has arisen, the like of which has never existed in the art of any period or any nation.' Biographies of B. are numerous. Among others, we may mention those of Ries and Wegeler (1838), Schindler (3d ed. 1860), Marx (2d. ed. 1863), Nohl (1864), Thayer (1866-71). See also Nottebohm, *Skizzenbuch B.'s* (1865), and the *Letters* of B., published by Nohl (1865-67).

Beetle, the popular name of insects belonging to the order *Coleoptera*. This order is distinguished by the front pair of wings being converted into horny *elytra* or *wing-cases*, beneath which the hinder and functionally useful pair are folded when at rest. The hinder wings are therefore the only pair useful for flight. The mouth is eminently masticatory, or adapted for biting—two large mandibles, and two maxillæ, or lesser jaws, existing.



Beetle.

The antennæ, or feelers, vary greatly in form. The legs may be adapted for running or for swimming. The tarsi are generally composed of five joints. The metamorphosis is of the holometabolic, or complete variety, the pupæ being free and quiescent, whilst the larvæ, composed of thirteen joints, are active grubs. This order includes an immense number of species, and is classified chiefly by a reference to the number of joints in the tarsi or feet, as recommended by Latreille. The B. thus forms the sections *Pentamera*, *Heteromera*, *Tetramera*, and *Trimera*, accordingly as the tarsi are five-jointed, the front tarsus five, and the under four-jointed, all four-jointed, or all three-jointed respectively. See also *COLEOPTERA*, and the respective articles on the various kinds of beetles.

Beet'ling, a process largely employed in the finishing of bleached, dyed, or printed cloth, when it is not wished to give a flat or glazed finish to the texture. The process now employed on a manufacturing scale is to wind the cloth on a strong wooden or metallic beam, which is laid under a frame containing a range of heavy falling piles. The beam is slowly rotated, and a toothed roller causes the piles alternately to rise and fall, striking heavily on the cloth.

Beet'root-Sugar, a saccharine substance identical with cane-sugar residing in the juice of the beet to the extent of from 7 to 15 per cent. In 1747, Marggraf, a Berlin apothecary, made known its existence, and proposed the systematic cultivation of the white beet for the extraction of sugar, but owing, among other causes, to the cheapness of cane-sugar imported into Germany, no practical result ensued. About fifty years later Achard and Hermstädt called attention to the subject, and shortly after the commercial manufacture of B.-S. was begun. The desire of Napoleon to render France independent of British colonial produce gave the new industry a powerful impetus in France,

and although it collapsed after his fall, the B.-S. manufacture was soon re-established on sounder principles than before, and during the past thirty years it has prospered in a remarkable degree in that country, as well as in Germany, Belgium, Holland, Austria, and Russia. An idea of its enormous development may be gathered from the fact that the total B.-S. produce in Europe in 1872-73 was 1,025,000 tons, of which France furnished 375,000, and Germany 250,000 tons. The ordinary process of obtaining the B.-S. is briefly as follows:—The washed roots are macerated by circular saws making ten revolutions in a second, and the pulp thus produced is placed in strong linen bags, and subjected to hydraulic pressure, averaging 500 to 700 lbs. per square inch. The expressed juice is then heated in a pan by steam to 85° C. (185° F.), and milk of lime is added and stirred with the juice, the mixture being raised to near its boiling-point; the albuminous constituents are removed by the lime, and other impurities and colour by filtering through flannel and animal charcoal; a current of carbonic acid neutralises the excess of lime; a density of 42° Beaumé (sp. gr. 1.412) is acquired by evaporation in a vacuum pan; and after heating in another vessel to over 120° C. (248° F.), stirring the while, the magma is left for several days to drain off the molasses from the crystalline sugar. The molasses has a disagreeable taste, and is not fit for sweetening, but it yields spirit on distillation, and mixed with other fodder it is used as food for cattle. The production of B.-S. has been successfully carried out in some parts of England, but not on a scale commensurate with the adaptation of English soil for the culture of the sugar-beet. The imports of B.-S. into Great Britain from the Continent amounted in 1873 to over 220,000 tons.

Beffa'na, or Befa'na (a corruption of *Epiphania*), according to tradition in Italy, is an old woman who has a great deal to do with children on Twelfth Night, but who keeps, all the year round, so sharp a watch over their conduct that her name is used as a scare-word, (like *Knecht Ruprecht* in Germany, or the 'Bowsy Man' (*der Böse I*) in Scotland), to awe them if they are naughty. Her industry as a housewife was so great when the three wise men of the East were passing her house on their way to make presents to the infant Saviour, that she had no time to go out and look at them, but she hoped to see them on their way back. They, however, returned another way; and she, in her ignorance of this fact, has been watching for them ever since, busying herself about children, as they gave their treasures to the Child in the manger. On Twelfth Night youngsters are put early to bed, a stocking of each being hung before the fire; into it she is supposed to put a present, expressive of her sense of their conduct during the year—ashes being her rebuke for really bad conduct. In Florence, the name is given both to the festival of the Epiphany, and to a sort of puppet made up of bits of cloth, which on the eve of the festival is carried through the streets with shouts of rejoicing. There is little doubt that the practice is a 'survival' from the mystery-plays of the middle ages, but it is not clear what the puppet symbolises. Perhaps the babe Christ. See EPIPHANY, BEAN-KING'S FESTIVAL.

Beffroi was a wooden tower constructed in several stages or stories communicating with each other by ladders. It was used in siege operations in ancient and in mediæval times. The B. was moved upon wheels close to the wall of the besieged town. Its highest story was fitted with a hinger draw-bridge, which was let fall upon the coping of the wall, and across which the soldiers that crowded its different stages poured over upon the besieged. This contrivance is mentioned by Cæsar, described by Froissart, and was last seen on the field in England during the wars under Charles I. See BELFRY.

Beg, or Bey. See BEY.

Be'gas, Karl, a distinguished German painter, born at Hemsberg, near Aix-la-Chapelle, 30th September 1794, became a pupil of Gros (Paris) in 1812, studied afterwards at Rome, and was a Member of the Academy and court-painter at Berlin from 1825 till his death, November 23, 1854. B.'s pictures are partly biblical, partly romantic, and partly genre-pieces. Of the first may be mentioned his 'Baptism of Christ' (1825), in the style of the old Florentines, which was placed in the garrison church at Potsdam, and his fine fresco of Christ and the four Evangelists surrounded by a choir of angels in the church of

Cracow. Specimens of the other classes are the 'Loreley,' 'Girls under the Oak-Tree,' 'The Vine-Dressers,' &c. He is chiefly memorable as a master of light and shade. His three sons, Oscar (born 1828), Reinhold (born 1831), and Adalbert Franz Eugen (born 1836), are also artists of merit. The first is a professor in the Berlin Academy, and noted for his skill in portraiture; the second is a sculptor; the third was originally an engraver, but is now a painter.

Beggar, one who asks for alms—a mendicant. Considered merely with regard to the *wealth* of nations, the problem of how to deal with those who cannot, or who will not, support themselves, is not very difficult of solution. If a man, through misfortune, or even through his own imprudence, has got into circumstances in which he cannot support himself, and there is reasonable hope that assistance will ultimately enable him to do so, the law of political economy sanctions our giving assistance. But if there is no hope of the man becoming self-supporting, then the dictum of the law in question is that he should die. And there can be no doubt that the material prosperity of a community acting on this law would be advanced. Mendicancy would die out. But, plainly, to carry out the law to this stern extremity is not possible. There are laws which affect human nature besides those of political economy. We could not see our fellow-mortals dying round us for want of sustenance and refuse to give it, even though the want arose wholly from their own fault, and however greatly our refusal might ultimately conduce to national prosperity. But if political economists must keep in mind that the highest culture of human nature cannot be arrived at through political economy alone, another and a larger class will do well to remember that the laws of political economy cannot be infringed with impunity, and that the excellence of the motive which led to the infringement will abate nothing from the evil consequence.

In dealing with the poor, then, the legislature should keep in view both of these forces, and endeavour to assist in the difficult task of making them work in harmony. To the same end it is the duty of individuals to remember that to do good is the work of knowledge, and that the indulgence of feeling, without the knowledge required to guide it, may do, almost surely will do, mischief and not good. It may indeed be questioned if malevolence does as much harm in the world as misdirected benevolence. By our law (see next article) begging is not allowed. Nevertheless it greatly prevails, usually more or less disguised, but not unfrequently without disguise—facts which, did space permit, might lead us to consider the question of What constitutes begging? The boy who offers you a box of matches or a newspaper may be troublesome, but he is not a B., and should be spoken to encouragingly, because there is a reasonable probability that one may want a newspaper; but the man who reads you a Scripture verse with the view of being paid for it is a B. under a very flimsy disguise. In some Christian countries, notably in Spain and in the East, indiscriminate almsgiving is considered a religious duty. Hence these lands swarm with indolent and filthy beggars, and thus does the cancer of pauperism eat into the vitals of the country till the whole body becomes diseased. Climate has unquestionably much to do with mendicancy. Where there is no winter, where soil and climate give the means of subsistence without labour, *there* are conditions favourable to it; where the bulk of the population must work hard or starve, *there* are conditions unfavourable—that soil and that climate being on the whole most favourable to man which award wealth to labour and starvation to indolence.

Beggars, Law of England relative to. The Vagrant Act, 5 Geo. IV. c. 83, classifies B. first, as 'idle and disorderly persons'; second, as 'rogues and vagabonds'; and, third, as 'incorrigible rogues.'

In the first class are every person able wholly or partly to maintain himself or family, neglecting to do so, whereby they become chargeable to the parish; petty hawkers, or pedlars, without licence; prostitutes in the streets or highways; those who in any public place, court, or passage, beg or cause any child to do so. All such are 'idle and disorderly persons,' punishable with one month's imprisonment, or with being sent to the House of Correction.

'Rogues and vagabonds' are all convicted a second time of being 'idle and disorderly'; fortune-tellers; expositors of wounds or deformities in order to get alms; players or betters in the streets; loiterers, or persons suspected of having picklock or

other suspicious implements in their possession. All these are 'rogues and vagabonds,' whom a justice of the peace may send for three months to the House of Correction.

'Incorrigible rogues' are those escaping from confinement before expiry of the period embraced in their sentence; those twice committed as rogue and vagabond; and those violently resisting apprehension as rogue and vagabond, and subsequently convicted of being so. This class is liable to one year's imprisonment, and male offenders may be whipped.

The Act 34 and 35 Vict. c. 108, makes some additions to the first and second class.

Justices are under statutes enabled to give some small pecuniary assistance to prisoners on their discharge. See POOR and POOR-LAWS.

Beghar'mi, or **Baghir'mi**, a kingdom of Central Africa, to the S.E. of Lake Tchad, watered by the Shari and its tributary the Serbenal, with an area of 43,200 sq. miles, and a pop. of about 1,500,000. The country is flat, and moderately productive, but worms and ants abound, and are very destructive to the crops. The inhabitants profess Mohammedanism, but are grossly superstitious. Throughout the Sudan the beauty of the women is famed. Masenja is the capital. B. is tributary to the adjoining state of Bornu, but is ruled by a sultan who is absolute within his dominions.

Beg'kos, or **Bei'kos**, a small seaport in the Turkish vilayet of Scutari, on the Bosphorus, the scene (according to tradition) of the pugilistic fight in which King Amycus was killed by Polydeukes, the Argonaut. The allied fleets anchored here (1854) before the Crimean War began.

Beg'lerbeg. See BEY.

Begonia'ceæ, a natural order of dicotyledonous plants, allied to *Cucurbitaceæ* (q. v.); herbaceous plants or low succulent



Begonia discolor.

shrubs, alternate leaved, with long dry stipules; flowers in cymes, unisexual, perianth-coloured, with four unequal divisions in the male flowers, and five to eight in female ones; stamens numerous; fruit winged, capsular, three-celled, dehiscing by slits at the base; seeds minute, numerous, and without endosperm. There are about 400 species and 42 genera, natives chiefly of India, S. America, and the W. Indies. Most of them have astringent, bitter, and occasionally purgative properties. Nearly all have pink flowers; and some are cultivated in our hothouses. One, however, grows on the Himalayas, at the height of 11,000 to 12,000 feet. Some are used as pot herbs, but none are of particular importance.

Beg-Shehr Göl, a fresh-water lake in the tableland of Asia Minor, vilayet of Konia, 39 miles S.W. of Konia. It is about 30 miles long, and from 8 to 12 broad. On its shores lie the towns of B. and Kereli, the ancient *Caralis*.

Beg'tash'i, a Turkish religious order, founded in the 14th c. by Hadji Beg'tash, a famous dervish. It is a secret order, the members of which are numerous, and many of them influential; but it has not made itself felt either as a religious or political force in the Ottoman empire.

Beguines', **Begui'næ**, or **Begutt'æ**, the name given to a German and Belgic religious order of women. The date of its origin is somewhat uncertain, but it became prominent in the 13th c. Of the causes which led to the establishment of the sisterhood, one was no doubt the Crusades, since they were a constant drain on the male part of the population. As another cause has been assigned the prevailing dissoluteness of the time, which caused many widows and virgins, desirous of a peaceful and virtuous

life, to form into these societies. There has been much discussion as to the origin and precise significance of the word B. Popular tradition has derived it from a certain mythical St Begga, who was supposed to have founded the order in the 7th c. It has been also suggested that one Lambert le Bègue (or Stammerer), a priest, gave his name to a society which he instituted at Liege in 1180; and finally, some have conjectured that the title of *beguine*, applied first to women of singular devoutness, was afterwards restricted as the name of the sisterhood. The B. did not live under any appointed rule, and were not bound by any vows of celibacy. There was a lady superior at the head of each society, and the time of the sisters was spent in devotions, works of charity, and various suitable industries, such as weaving and embroidering. The *beguinage*, or *vineyard*, as the habitation of the B. was called, consisted generally of a number of small dwellings clustered together; and each community had its chapel, hospital, and house for the accommodation of guests and strangers. In the 12th and 13th centuries, these societies spread over Germany, Holland, and France, till hardly any town of consequence wanted its *beguinage*. Among the chief were those of Aix-la-Chapelle, Hamburg, Brussels, Cambray, Leipsic, Cologne, Magdeburg, Bruges, Ghent, Douay, Mons, Namur, Tournay, and Valenciennes. In the 14th c. the B. became infected with the heterodoxy of the 'Mystic Brethren and Sisters of the Free Spirit.' They shared the persecution which the Mystics met with from the Inquisition; and besides, the wealth of the B., and certain suspicions of immorality, exposed them to violence and oppression. Being disliked by the labouring class, particularly by the weavers, their houses were broken into, and their goods plundered. Several of the Popes endeavoured to protect them; and in various places they joined the regular monastic orders as a means of safety. But the decline of the B. commenced in the 14th c., especially in France; they continued longer to exist in the Low Countries and Germany. The *beguinen-hauser* of the latter country are nothing more than almshouses; but there is a *beguinage* at Ghent, and the order still survives at Amsterdam, Antwerp, Mechlin, and Bruges.

Beghards (Ger. *begghard* *begheren*, to seek eagerly, to importune) the German name for a class of irregular monks, called in France *Béguins*, in Italy *Bisachi* and *Pocassoti*, but not connected with the B. proper. They appeared first at the commencement of the 13th c., and soon swarmed over Europe. The B. were held in low repute, as is testified by the names popularly given them—*bons garçons*, 'vagabonds,' &c. They were originally an offshoot from the Franciscans, and were divided into various sections, according to discipline and belief, but all included under the one name. The fraternity was suppressed in the 14th c. on account of its heresies, and was absorbed again into the Franciscan order. See Mosheim's *Ecclesiastical History* (vol. iii. ed. Lond. 1783), and his *De Beghardis et Beguinabus*, (Leips. 1790), also Hallmann's *History of the Origin of B. in Belgium* (Berl. 1843).

Behaim', Martin, a navigator and geographer, was born at Nurnberg, 1459, and as a merchant visited Venice, Mechlin, Antwerp, and Vienna, and resided at Lisbon for four years from 1480. Having here acquired a reputation for map-making, he was appointed by King John I. president of a *Junta de Mathematicos*, which was to form tables of the sun's declinations, and to teach pilots to navigate by the altitude of the sun and stars. He made an important expedition to the west coast of Africa with Diego Cam, and lived from 1486 to 1490 in the Azores, after which he returned to Nurnberg, where he resided for two years. In 1492 he completed his famous globe or 'world apple,' which is still preserved in the B.-house at Nurnberg. B. returned to the Azores, and lived there from 1494 to 1506. He died at Lisbon, July 29, 1507. See Ghillany, *Geschichte des Seefahrers Ritter Martin B.* (Nurnb. 1853).

Behaim, Michael, a German meister-singer of the 14th c., was born at Sulzbach, near Weinsberg, in 1416, and died in 1475. By none of his contemporaries was he excelled in fertility. His chief works are his *Buch von den Wiennern*, on the insurrection of the Viennese against Friedrich III. in 1462 (Karaicz, Vien. 1843); *Leben des Pfalzgrafen Friedrich I. bei Rhein* (1469, unpublished); *Gedicht von der Liebhabung Gottes*; *Geistliche Gedichte*, &c.

Behend'ing. See CAPITAL PUNISHMENT.

Behistun is the name of a ruined town in the Persian province of Irak-Ajemi, and of a sacred rock close by. On the perpendicular face of the rock, 300 feet from the ground, is cut the great trilingual cuneiform inscription deciphered by Sir Henry Rawlinson in 1839 and following years. The work in all the columns—Persian, Median, and Babylonian—is beautifully finished, the faults in the polished limestone surface being filled with new stones secured by lead, and the whole inscription coated with siliceous varnish. The inscription gives a list of the nine Achaemenian monarchs of Persia, and of the victories of Darius Hystaspes, by whom it was erected, probably in 516 B.C. The five Persian columns, containing 400 lines, have yielded an alphabet of Persian cuneiform of forty characters. Before 1839 the value of a few characters had been ascertained; but the translation is substantially due to the comparative analysis of Rawlinson, based on suggestions from the Zend and Vedic Sanskrit languages. There is also on the rock-face a representation of Darius, his foot on the body of Gomates the magian; before him stand nine captive rebels, viz., Atrines and another of Lusiana, Natitabirus and Aracus of Babylon, Phnortes of Media, Sitratathmes of Sagartia, Veisdates of Persia, Phraates of Margiana, and Sarukha, the Sacan, whom Darius in person defeated on the Tigris. Frequent reference is made in the text to the rooting out of heretics by the help of Ormazd, to whom B. is sacred. The rebel leaders seem usually to have been crucified after mutilation of ears, nose, and lips.

Behn, **Aphra**, or **Aphaar**, perhaps the most licentious dramatic writer of the most licentious English era, belonged to a Canterbury family named Johnson, was born in 1642, resided for several years, when young, in Surinam, returned to England, and married Mr B., a Dutch merchant. She is said to have been introduced to Charles II., who deputed her to watch his interests in Flanders. On her return to England she became a writer of letters, tales, poems, plays, which are happily now remembered only by antiquarians. She died in London, April 16, 1689. *The Plays written by the late Ingenious Mrs B.* were reprinted in 4 vols. 1871. See Ward's *English Dramatic Literature* (Lond. 1875).

Behring, properly **Bering**, **Vitus**, a famous navigator, was born at Horsens, in Jutland, in 1680, and served with distinction as a captain in the navy of Peter the Great during the Swedish wars. He was appointed subsequently by Catherine to explore the Sea of Kamchatka, and in 1728 gave his name to the strait which separates Asia from America, although it is now believed that the expedition did not sail so far north. *The coasts of Kamchatka and Okhotsk were investigated and the settlement of Petropaulovski founded by B., who afterwards led a second expedition along the American coast, which reached a point beyond lat. 60° N., but which was forced to return, and was wrecked on B.'s (formerly Avatska) Island, where he died, December 8, 1741.

Behring Strait, the channel which separates Asia from America, some 50 miles broad at its narrowest part, between E. Cape in the former and Cape Prince of Wales in the latter continent. It is nowhere deeper than 30 fathoms, and is therefore comparatively free from large icebergs. Deschnew, a Cossack, is believed to have discovered it in 1648, but his story was discredited till B.'s expedition in 1728.—**B. Sea** is a name occasionally applied to the Sea of Kamchatka, which extends from the Aleutian Islands N. to B. Strait.—**B. Island**, a Russian possession, is the westernmost of the Aleutians, and the place of B.'s death. It has an area of 30 sq. miles.

Beilan, a pass and town in the N. of Syria. The pass still forms, as it did in ancient times, the great highway from Asia Minor through Cilicia into Syria. The town of B., 1584 feet above the level of the Mediterranean, has a pop. of 5000. In 1832 the Turks were defeated here by the Egyptians.

Beira (Port. the 'river-bank'), the most populous province of Portugal, bounded N. by the river Douro, S. partly by the Tagus and partly by the province of Estremadura, and extends from the Spanish frontier to the Atlantic Ocean. It is for the most part mountainous, the Sierra d'Estrelia ranging from N. to S., but the valleys are fertile, and there is abundance of good pasturage. The rivers Mondego and Vouga water the centre of the

province. Viseu is the capital. The chief products are corn, wine, flax, honey, oil, and fruits, and the mountains are rich in iron, coal, and marble, which are, however, little wrought. Area 8586 sq. miles; pop. (1874) 1,390,092.

Beiram, or **Bairam**, the Persian name of the only two festivals of the Mohammedan year. The rejoicings of the Greater B. begin on the first of the month Shawal, at the end of Ramadan, the month of fasting—just as Easter follows Lent in the Christian Church—and last three days. Sixty days later, on the 10th of the month Shidji, the Lesser B. commences, and lasts four days; it is called *Kurban B.*—i.e., the B. or Festival of Sacrifice, for during its rejoicings sheep and goats are slaughtered and distributed among the poor.

Beir'out. See BEYROUT.

Beit is the Arabic form of the Hebrew *beth*, or more correctly *baith*, a house. Both are derived from verbs signifying 'to build' (like the Gr. *domos*, from *demō*); and enter into the composition of numerous names in their respective languages: e.g., Arab. *Baitullah* ('house of Allah' or 'God'), the name given to the sacred edifice at Mecca containing the Kaaba; *Bait-al-Haram* ('the house of the sanctuary'); in Heb. *Bethel* ('house of God'); *Bethany* ('house of dates'); *Bethoron* ('house of caves'); *Bethlehem* ('house of bread'); *Bethsaida* ('house of fish'); *Bethphage* ('house of figs'), &c. In Palestine, where the Arab has displaced the Jew, we now find the Arabic form instead of the Hebrew, as *Beit Dejan* ('house of Dagon').

Beit-el-Fa'kih ('house of the saint'), a town of Tehama, Arabia, 12 miles from the coast of the Red Sea and 85 N.W. of Aden, formerly a great entrepôt for the vast coffee trade of Yemen. There is still some trade in gum, wax, coffee, and pearls. The ports are Lohaja and Hodeida. B. has an extremely hot climate. Pop. 8000.

Beja (a corruption of the Lat. *Pax Julia*), the name of a fortified town of Alemtejo, Portugal, on a small feeder of the Guadiana, 18 miles S.E. of Lisbon, with which it is connected by rail. It has a cathedral, and contains many Roman and Moorish remains. Its chief manufactures are leather and earthenware. Pop. 5300.

Bejan, or **Bajan** (Fr. *béjaune*, a greenhorn or ninny; Old Fr. *bec-jaune*, 'yellow-nob'), a term still applied to junior students in the Universities of St Andrews and Aberdeen, and formerly in many universities on the Continent. It was intended to convey, with mild irony, the idea of their being still callow. *Bejaunia*, payments exacted from students on their entering college, and corresponding to the 'pay-off' of handicraftsmen now, were forbidden by statute in more than one French university about the close of the 14th c. In the University of Vienna, the name B. assumed the form *Beanus*.

Bejapur (Sansk. 'the victorious city'), a decayed city in the executive district of Kaladgi, province of Bombay, about 155 miles S.E. of Poonah, on an affluent of the Krishna. For centuries it was a great and splendid city, but after its capture by Aurungzebe in 1686, it sank into comparative insignificance. It afterwards came into the possession of the Mahrattas; but after the final destruction of the Mahratta empire in 1818, the British assigned B. to the Rajah of Sattara, resuming possession in 1848 on the extinction of the dynasty. In the height of its prosperity, it is said to have contained 100,000 dwellings; and a succession of ruins, the principal of which are Mohammedan tombs, extends from the western gate for a distance of five miles. There is still preserved at B. a piece of brass ordnance, cast in 1549, that carried shot weighing above a ton. Pop. (1872) 12,935.

Bejetlan, **Langsat**, **Lanseh**, or **Ayer Ayer**, the edible fruits of the genus *Lansium* (natural order *Meliaceae*, q. v.), natives of the E. Indian Archipelago.

Beka's, or **El-Beka's** ('the valley'), the Arabic name now given to the Coele-Syria (Hollow Syria) of the Greeks, the Plain of Lebanon of the Old Testament, a remarkable hollow or valley, extending for a distance of nearly 100 miles from N. to S. between Libanus and Anti-Libanus. Though fertile and well-watered, not much of it is under cultivation; but the Arabs avail themselves of its pasture grounds in spring for their cattle and

young horses. 'A screen, says Stanley (*Sinai and Palestine*, p. 421), 'through which the Leontes breaks out, closes the S. end of the plain. There is a similar screen at the N. end, but too remote to be visible,—'the entering-in of Hamath,' so often mentioned as the extreme limit in this direction of the widest possible dominion of the Israelite empire.'

Beke, Charles Tilstone, the celebrated Abyssinian traveller, was born in London, October 10, 1800, and for some time studied at Lincoln's Inn. His taste, however, led him to other studies than law, and his first publication, *Origines Biblicæ* (vol. i. 1834), displayed genuine attainments in philology and ancient history. In 1836 he was made British consul at Leipsic, and in 1840 joined a private expedition to Abyssinia, which had for its object to open up commercial relations with the countries S. of Egypt. The result of his observations appeared in *Abyssinia, a Statement of Facts, &c.* (Lond. 1846), an *Essay on the Nile and its Tributaries* (1847), and *On the Sources of the Nile* (1849), a *Mémoire Justificatif en Réhabilitation des Pères Paux et Lobo* (Par. 1848), and in many contributions to journals. In acknowledgment of his services, he received the gold medals of the Geographical Societies of London and Paris. Accompanied by his wife, in 1865, he made an ineffectual effort to release the European captives in Abyssinia, and subsequently contributed greatly to the success of Sir Robert Napier's expedition by recommending the landing-place, line of march, &c. He was granted a civil list pension in 1870. In the last year of his life B. visited the desert region N. of the Red Sea, where, in a peak to the E. of the Gulf of Akabah, he claimed to have discovered Mount Sinai, which he contended had not been identified by the Sinai Ordnance Survey Expedition. He was preparing an account of this journey when he died, July 31, 1874.

Békés (pron. *Bekesh*), the capital of a county of the same name, Hungary, at the junction of the White and Black Körös, has a trade in cattle and corn, and is noted for the culture of bees. Pop. (1869) 20, 125.

Bekker, Immanuel, an eminent German Hellenist, born at Berlin in 1785, studied at the University of Halle under F. A. Wolf, who considered him his most distinguished pupil. Appointed Professor of Philology in the newly-founded University of Berlin (1810), he was almost immediately sent to Paris to examine the Greek MSS. in the Imperial Library. Having become a member of the Academy of Sciences at Berlin in 1815, he was sent by that body to Paris again to gather materials for the *Corpus Inscriptionum Græcarum*. Two years later he proceeded to Italy, and afterwards examined the libraries in England and Holland. The fruits of his labour and intelligence both at home and abroad are seen in his *Anecdota Græca* (Berl. 1814-21), and in his splendid recensions of the texts of classical writers, the results of his careful examination of MSS. Among these may be mentioned his *Plato* (10 vols. Berl. 1814-21); *The Attic Orators* (7 vols. Oxf. 1823); *Aristotle* (4 vols. Berl. 1831-36); *Sextus Empiricus* (Berl. 1842); *Thucydides* (3 vols. Oxf. 1821); *Theognis* (Leips. 1815); *Aristophanes* (3 vols. Lond. 1825); *Photius' Library* (2 vols. Berl. 1824), &c. His part in the preparation of the *Corpus Scriptorum Historiæ Byzantinæ* amounts to 24 vols. B. died June 7, 1871.

Bel and the Dragon, History of, one of the apocryphal additions to the Book of Daniel, which in the LXX. bears the title 'Part of the prophecy of Habakkuk.' In all probability it is a legendary exaggeration of the record of the deliverance of Daniel (ch. vi.), as the original story in the LXX. was further embellished in later times.

Belä. Four Hungarian kings of the Arpad dynasty were so named, of whom the first and fourth are the most important.—**B. I.**, son of Ladislaus, spent the greater part of his life in Poland and Pomerania, and with some hard fighting made himself ruler of Hungary after the death of his brother, Andreas I. His reign was short (1061-63) but important; he suppressed the last attempts to re-establish idolatry, confirmed internal peace, strengthened the regal authority, fixed the standard of weights and measures, and introduced the representative system into the diet.—**B. IV.** (1235-70) was the son of Andreas II., who in 1222 had been compelled to sign the *Bulla Aurea* (Golden Bull), the great charter of Hungarian liberty. To the principles laid down

in the Golden Bull B. continued uniformly faithful, and he incurred the enmity of the nobility by his persistent attempts to break their power. In the midst of his struggles with the magnates the Mongols invaded Hungary, and defeated the royal troops on the Sajó in 1241. B. took refuge with Friedrich II., Duke of Austria, who ungenerously deprived him of his treasures and of the border counties of Hungary. The Mongols left the country in the second year of their conquest, when B. returned, restored the towns and villages, possessed himself once more of the border counties, and defeated Friedrich at Vienna in 1246. His son Stepan headed a rebellion against him, which was not suppressed in 1270, the date of B's death. There is also a **B. V.**, a grandson of B. IV. by the mother's side, who reigned over Hungary for a year.

Belaying, a nautical term, denoting the fastening of a rope by giving it several turns round a cleat, kevel, or *B. pin*: the latter, an ash staff fully a foot long.

Belbeys, or **Belbeis**, a town of Lower Egypt, on the E. side of the Pelusiac branch of the Nile, 28 miles N.N.E. of Cairo, with a pop. of about 5000. It was once more important and populous than now, but it is still a station on the great caravan-route between Egypt and Syria. About 10 miles N.N.W. of B. are the ruins of Tell Bastah, the *Bubastis* of antiquity, and about the same distance N. the ruins of *Putamus*, the Pithôm of Exodus, which the Hebrews built for their Egyptian masters.

Belcher, Sir Edward, C.B., F.R.S., and F.G.S., an English naval officer and explorer, born in 1799, and entered the navy in 1812. He was assistant-surveyor in the expedition fitted out under Captain Beechey to explore Behring's Strait (1825-28); in 1830 he was engaged on the survey of the coast of Africa; and from 1836 to 1842 on that of the Pacific. On his return he published a narrative of the voyage, during which he had made the circumnavigation of the globe, and rendered valuable service to Lord Gough by his soundings taken in the Canton river. It is entitled *Narrative of a Voyage Round the World, performed in H.M. Ship Sulphur, &c.* (1843). In 1843 he was promoted to the rank of post-captain, and knighted. In 1844 appeared his *Voyage of the Samarang to the Eastern Archipelago*. From 1852 to 1854 he commanded the expedition sent to search for Sir John Franklin, and brought the crews of the ice-bound vessels to England, October 1854. He gave an account of this expedition in *The Last of the Arctic Voyages* (Lond. 1855). B. was appointed rear-admiral in 1861, vice-admiral in 1866, and K.C.B. in 1867. He died 18th March 1877.

Belchite, a town in the province of Saragossa, Spain, 220 miles N.N.E. of Madrid, famous as the scene of a decisive victory of the French, under Suchet, over the Spanish, commanded by General Blake, June 18, 1809.

Belem (pron. *Beleng*, a Portuguese corruption of *Bethlehem*), a suburb of Lisbon, Portugal, formerly an independent village, lies towards the S.W., on the right bank of the Tagus. In November 1807 it was taken by the French, and the Portuguese court sailed hence for Brazil. B. has a royal castle, a beautiful church, in which are the tombs of the kings of Spain, and a building formerly a monastery, now an orphanage.

Belem, or Para. See PARA.

Bel'lemnites, a genus of fossil *Cephalopoda* (q. v.), or Cuttlefishes, belonging to the family *Belemnitidae*, and to the *Dibranchiate*, or two-gilled section of the above class. The forms known as *B.* are exclusively found in the rocks of the Mesozoic Period, and consist of the fossilised internal shells of cuttlefishes allied to the *Sepias* and *Loligos*, or *Squids* of our own day. The extinct genera *B.*, *Belemnella*, *Belemnoceras*, and *Xiphoteuthis*, are included under the general name of *B.* The *B.* were cuttlefishes possessing ten arms, furnished with suckers and lateral fins. The perfect fossilised shell consists of a chambered cone or *phragmacone*, containing the *ink-sac*, and prolonged in front into a *pen* or *pro-ostacrum*; whilst posteriorly the phragmacone is lodged in a conical cavity or *alveolus*, excavated within a cylindrical sheath, the *guard*. A tube or *apophysis* perforates the septa, or partitions of the chambered portion, at their ventral or lower margins. These fossils have received the

popular name of 'thunderbolts,' 'arrows,' 'spectre-candles,' &c. Some specimens indicate the size of the living animal to have been 2 to 4 feet in length. Familiar species are *B. acurarius* (Lias); *B. clavatus* (Lias); *B. hastatus* (Oolite); *Belemniteella mucronata*; *B. plana*, &c.

Belfast (Gael., originally *Bel-feirsde*, 'the ford of the farset, or sandbank'), the most important manufacturing city in Ireland, the capital of Ulster, and the chief seat of the linen trade, is situated at the point where the Lagan enters B. Lough, 12 miles from the Irish Sea, and 101 N. of Dublin by railway. It is only 6 feet above the sea, and stands partly on a site reclaimed from the marshes of the river, which is here 250 yards wide, and is crossed by four bridges. Divis Hill (1567 feet) and Cave Hill (1185) form a picturesque background to the city, and the principal buildings are Queen's College, the Royal Academic Institution, the Wesleyan Methodist College, Ulster Bank, the Harbour Office, Ulster Hall, the Post-Office, a Museum, a Linen Hall, Commercial and Corn Exchanges, a Convalescent Hospital (1877), numerous fine churches, and a Botanic Garden of 17 acres. Queen's College, a fine building in the Tudor style, which cost £26,000, was opened in 1849, and has (1875), nearly 300 students and 18 professors. The staple manufactures of B. are linen and cotton, the former industry dating from 1637; besides which there is extensive linen and cotton spinning, calico-printing, bleaching, dyeing, iron-founding, and brewing. B. is the greatest shipbuilding place in Ireland, employing upwards of 2000 men in iron-shipbuilding alone. In 1874 there were five ships of 16,000 tons built. There are also flour, oil, barilla, and alabaster mills, several chemical works, rope and sailcloth yards, and sawmills. B. will, on completion of vast improvements now in progress, be one of the first-class ports of the United Kingdom, having five new docks and a tidal basin of 25 acres. In 1874, 7012 vessels of 1,305,016 tons entered the harbour, and 3964 of 922,009 tons cleared. The customs duties for 1874 amounted to £401,830. Pop. (1871) 174,394; estimated pop. (1876) over 200,000. In the 14th c. Edward Bruce sacked B., and it may again be said to have risen to importance in 1611, when its charter was granted. During the civil war it first supported the side of the Parliament, and then embraced the royal cause. A rupture between the Protestants and Catholics of B. led to one of the most formidable and destructive riots of late years, August 15-21, 1872. B. sends two members to Parliament, and is under a corporation consisting of a mayor, 9 aldermen, and 30 councillors. It is the northern headquarters of the military. The rateable property was valued in 1864 at £270,930, and in 1874 at £482,419. There are in B. (1875) 14 newspapers, including 7 dailies. See Bann's *History of B.* (Belf. 1877).

Belfort, the chief town in the Territoire de B., in the N.E. of France, on the Savoureuse, with a considerable trade in iron, leather, wine, and fruit. It was fortified by Vauban, was long a stronghold of the first rank, and commands the *Troude de B.*, the gap between the Jura and the Vosges. In October 1870 the Germans under Treskow besieged B., which showed a resolute defence till 16th February 1871, when, on capitulating, the troops were allowed to march out with all the honours of war. Pop. (1872) 7910. The Territoire de B. consists of those portions of the department of Haut-Rhin which were restored

to France by the Germans on the peace of Versailles, February 26, 1871. Area 234 sq. miles; pop. (1872) 56,781. In a three days' fight (15th-17th January 1871) General Werder here successfully resisted General Bourbaki.

Belfry (Old Fr. *berfro*), a bell-tower, usually attached to a church, but sometimes separate from it. The term is sometimes applied to the frame on which the bell is suspended. B., meaning a tower, is synonymous with *Campanile*



Belfry.

(q. v.). Where there is only a single bell, it is sometimes

placed in an arch constructed on the W. end of a church or chapel, called the *bell-cote* or *bell-gable*, in which case a smaller arch is sometimes formed on the E. gable, over the altar, for the sanctus-bell. The origin of the term shows that the word B. is a corruption. The Old Fr. *berfro*, Low Lat. *berofradus*, has etymologically nothing to do with bell. It is formed from the Middle High German *berurit*, a watch-tower, in which a bell would naturally be placed to ring an alarm. Then the name would easily pass over to the bell-tower of a church, and the word be corruptly spelled to suit the new application. For a quite different use of the term, see BEFFROL.

Bel'gæ, occupied one of the three great divisions of Gaul, being bounded on the W. by the ocean, and on the E. and N. by the Rhine, and separated from the Celtæ in the S. by the Seine and Marne. Cæsar sometimes uses the name Belgium, or B., in a limited sense; for example, as the designation of the country of the *Bellovac*. The name, indeed, seems to have belonged to a few powerful tribes bordering on the Seine, and to have been adopted by Cæsar as a generic name for all people N. of the Seine. The B. were a Celtic people, though to some extent mixed with Germans. They had a reputation for bravery beyond all the other inhabitants of Gaul. Cæsar found Belgic immigrants on the coasts of Kent and Sussex; and Ptolemy mentions a British population of that name in Wilts and Somerset. The British B. seem to have belonged to the same race as the Gallic.

Belgaum, a fortified town, capital of an executive district of the same name, province of Bombay, British India, 42 miles N.W. of Dharwar. B., taken by the British under General Munro in 1818, after the victory of Korygaum, in which Sepoy and European rivalled each other in valour and fortitude, is now one of the most important military stations in India. An institution for the education of the native youths is liberally supported. Pop. of the town (1872) 26,947, exclusive of the cantonment, which at the same date contained 5330 more.—The district of B. has an area of 4591 sq. miles, with a pop. (1872) of 938,750, of whom 814,651 were Hindus. The Mohammedans only numbered 71,386; Buddhists and Jains, 47,564; and Parsees, 82. The prevailing languages are Marathi and Kanarese.

Belgiojo'so, a town in the province of Pavia, N. Italy, with a pop. of about 4000. It has a magnificent aqueduct and a fine castle, in which Francis I. spent the night before his defeat and capture at Pavia.

Belgiojoso, Cristina, Princess of, an Italian lady distinguished for her patriotism, the daughter of the Marchese Geronimo Isidoro of Trivulzio, was born 28th June 1808, married in 1824 to Prince Emilio of Barbiano and B. She took an active part in the revolutionary movement of 1830, and raised a corps of volunteers at her own expense in 1848. After the occupation of Rome by the French, she went first to Athens, and afterwards to Constantinople, but returned to Italy on the proclamation of the amnesty of May 1856; received back her property, and, abandoning the extreme views of the Mazzinists, worked for Cavour's policy after 1858. She died at Milan, 5th July 1871. The Princess was also an authoress of some merit.

Bel'gium, the most densely peopled state of Europe, bounded N. by the Netherlands, N.W. by the German Ocean, S.W. and S. by France, and E. by Dutch Luxembourg, Rhenish Prussia, and Dutch Limbourg, lat. 49° 30'–51° 30' N., long. 2° 33'–6° 5' E. It is somewhat in the form of an isosceles triangle, with its base, 382 miles in extent, resting on France, and has a flat and regular coast-line, only measuring 42 miles. On the whole a flat country, it is along the coast little raised above the high-water level, and has to be protected against the inroads of the sea by artificial dikes, where the natural barriers, consisting of sandhills, are either wanting or inadequate. The southern provinces slope gently towards the N., and those in the S.E. are traversed by a portion of the Ardennes, in which the greatest height is the peak of Stavelot with an elevation of 2000 feet. This tract of the highlands of Ardennes separates the basin of the Maas from that of the Moselle. In the N.E. of B. a sterile, heathy region (Peel and Campine) breaks the general prospect of rich, well-cultivated country, abounding in villages, clad with vegetation, and intersected by canals. B. has an extreme length from

N.W. to S.E. of 173 miles; a breadth from N. to S. of 112 miles; and an area and pop. (1874) distributed as follows:—

Provinces.	Area in Square Miles.	Pop. in 1874.
Antwerp	1,093	582,735
Brabant	1,267	942,247
E. Flanders	1,160	691,190
W. Flanders	1,250	803,693
Hainault	1,436	949,346
Liège	1,117	635,076
Luxembourg	931	204,619
Namur	1,705	208,339
Namur	1,413	319,386
Total,	11,372	5,336,634

The kingdom is further portioned out into 41 arrondissements, which again are subdivided into 303 cantons de milice, and 2568 communes, but the whole area so minutely divided is only about twice as large as Yorkshire. It is, however, extremely populous, having an average of 462 inhabitants to the sq. mile—a number exceeded greatly in the northern provinces; as, for example, in E. Flanders, which has 735 to the sq. mile. There are four towns of above 100,000 inhabitants (Brussels, Antwerp, Liège, and Ghent).

Hydrography and Climate.—The only great rivers of B., the Scheldt and the Maas, both rise in France, and flow into Holland before reaching the sea. They are both navigable throughout B., in which country the course of the former is 135 miles, and that of the latter 110. Each has numerous tributaries, the principal of those belonging to the Scheldt being the Lys, Dender, and Rupel; and of those joining the Maas, the Sambre, Ourthe, and Roer. Admirable means of intercommunication are thus afforded by nature, and these advantages have formed a basis for the construction of an artificial water-system (300 miles) only second to that of Holland. The *Zeuarts* and *Deynse* canals are the principal arms of this system, which links together the various rivers, and brings the remotest town within the circle of communication. The climate of B. is chilly and humid, the prevailing winds being from the S.W., the W., and the E., and the annual fall of rain amounting to some 26 inches. There are on an average some 150 rainy days in the year. A clear autumn season is unknown, the cold spring giving place to a capricious summer, which is immediately followed by a long, dreary winter. In summer the heat is sometimes extreme. The temperature ranges from 102° F. to 23° F.; the mean summer temperature is 55° F., and that of winter 36° F.

Geology and Mineralogy.—The N.W. and centre parts of B. are covered with Tertiary formations, in which the different periods are completely represented; the Pleiocene alone, however, containing many fossils. In the E. and S. is the Palæozoic region, in which Silurian, Carboniferous, and Devonian strata prevail, and which contains vast deposits of coal and iron. B. ranks next to Britain as the best coal-producing country of Europe, the fields of Namur alone far exceeding in extent those of all France. As many as 83 coal-fields are enumerated in the three provinces of Hainault, Liège, and Namur; and in 1874 there were 193 mines, employing over 800 steam-machines and 94,186 men. The average yearly amount of coal produced for the five years 1868–72 was 13,662,945 tons; for the year 1871 it amounted to 13,733,176 tons; value, £6,152,120. The 'output' of Hainault alone in 1873 was 11,652,953 tons, at 17s. 4d. per ton; the number of men employed was 79,556, the quantity raised being thus 146 tons per workman; and as the cost of production is estimated at £7,596,664, or 0.652l. a ton, the aggregate profits were £2,614,396. The export of coal from B., which is chiefly to France, amounted in 1874 to £5,130,883. The central region of the iron trade lies between the Maas and the Sambre, where there are numberless mines. About two million tons of ore are produced annually, but of late years the iron trade of B. has been considerably injured by the steel manufacture of Germany. The other important minerals of B. are copper, chiefly in Hainault and Liège; lead, in Liège, Namur, and Luxembourg; calamine or carbonate of zinc, in Liège; and black marble, at Dinant. In various parts of the country there are also found manganese, sulphur, alum, slate, and building-stone.

Botany, Agriculture, and Zoology.—The botany of B. closely resembles that of the N. of France, and presents a wide variety of

indigenous vegetation. The principal 'forest-trees' are the oak, chestnut, beech, elm, ash, walnut, fir, and poplar, and among the 'fruit-trees,' the vine, apple, pear, cherry, and plum are conspicuous. England is indebted to B. for the cabbage, lettuce, clover, the gooseberry-tree, the carnation, and the wallflower. For many years B. has taken the lead in agriculture, and has been justly regarded in this respect as the foremost country in the continent of Europe. The soil consists of either sand or clay, and is not naturally fertile, but indomitable energy and skill have brought seven-eighths of the whole surface under cultivation, and forced from it twice as much corn as is required by the vast population of the whole country. Much attention is given to the rotation of crops, and artificial manures are widely used. The general crops are wheat, rye, barley, oats, and buckwheat, and in the central provinces there is much beetroot (for sugar), chicory, and tobacco. Flax, hops, and clover are extensively grown, and form valuable articles of export, and along the banks of the Maas the vine is carefully cultivated, but the produce is of inferior quality. To Flanders belongs a famous breed of large horses, of which great numbers are sent to England and other countries. Of these, B. had in 1866 as many as 283,163; also of horned cattle, which are usually stall-fed, 1,242,445; and of sheep 686,015. In the forests of Ardennes there is still much wild game, such as the bear, wolf, boar, and roebuck, while the moors round Verviers are said to be the last asylum of the heathcock on the Continent. The ordinary domestic animals of Europe are reared everywhere in perfection, and the culture of bees and of the silk-worm is pursued successfully.

Manufactures and Commerce.—Even as far back as the Roman invasion the Belgians were remarkable for the same love of trading which has particularly distinguished them in later times; but it was in the middle ages that the foundations of the modern prosperity were laid. In the 13th c. Bruges had become the great northern seat of manufactures, and carried on a lucrative commerce with Italy. Bruges was soon to be outshone, however, by Antwerp, which, after the discovery of America, rose to the rank of the wealthiest commercial city of Europe, and which still continues to be the chief emporium of the Belgian trade. Among the manufactures for which B. is chiefly celebrated are Brussels carpets, unequalled for elegance and texture; fine lace and thread, made from flax so fine that it costs occasionally £400 a pound; and the rare lawn and damask fabrics of Bruges. There are also extensive manufactures of various linens, woollens, cottons, lace, silk, leather, and metals. At Ypres alone some 50,000 men are engaged in the woollen manufacture, and throughout E. and W. Flanders vast numbers are employed in the cotton industry. At Ghent and other places there are sugar-refineries; Waesland has great wooden-shoe factories; Boom and Rupelmonde have extensive brick-kilns; throughout the country are scattered 2670 breweries; and at Seraing, near Liège, there is one of the largest ironworks of Europe, producing chiefly locomotives and firearms, and employing over 5000 artisans. B. trades chiefly with France, Holland, England, Prussia, and N. America; and her principal ports are Antwerp, Ostend, and Nieuweport. The merchant navy in 1872 numbered 59 vessels (19 steam), of 32,346 tons; and in the same year the total entry at the ports was 6134 vessels of 1,878,106 tons. In 1873 the imports amounted to £96,992,320, and exports to £86,556,000; but these sums, it must be remembered, include the value of 'goods in transit;' the value of purely Belgian products exported being £46,344,000; and of imports for Belgian consumption alone, £56,908,000. The chief articles of export are coal, corn, cattle, woollens, linens, silks, cottons, flax, hemp, clover-seed, oak-bark, petroleum, lace, lawn, cambric, carpets, nails, arms, cutlery, and refined sugar.

Railways and Finance.—The railway system of B. is perhaps more complete than that of any other country of the Continent, and the cost of permanent way and buildings is estimated at no less than £18,280 a mile. It was originally laid down on a somewhat regular plan, having Mechlin as a centre, and radiating thence to the N., the W., the S.W., and E., but with its growth it has become an involved network of communication, stretching in all directions. In 1874 there were 2100 miles of railway in operation, of which 470 miles belonged to the state. The net revenue in the same year was about £1508 a mile. There were also 7031 miles of telegraph lines, and 23,994 miles of wires, transmitting annually about 2,300,000 messages. The national expenditure in 1874 was £9,536,696, and the revenue was

£9,185,720; and in the same year the public debt amounted to £36,981,960. The franc, as in France, is the unit of the monetary system of B., which was one of the countries that accepted the decimal system of coins, weights, and measures in 1865.

Government, Army, &c.—According to the constitution of March 3, 1831, B. is governed by a hereditary monarch, and by a Senate and a House of Representatives, both of which are elected by the people. Electors must be born or naturalised subjects above 25 years of age, and must pay £1, 13s. 4d. of taxes. There are some 60 senators, and double that number of representatives, elected by the same constituencies, the former for eight, the latter for four years. The King alone possesses executive power, but in Parliament he is represented by a responsible ministry, which controls the subjects of finance, public works, home and foreign affairs, war, and justice. Liberty of the person and of conscience, trial by jury, and freedom of speech and of the press, are secured by the laws. The administration of justice is almost similar to that of France, the statute-book being the Code Napoléon. In 1868 the army was remodelled and put on a compulsory footing, the period of service being nominally eight years; several years are, however, allowed for furlough. In 1874 the army consisted of 103,900 men, 12,894 horses, and 240 guns, and the civic militia numbered 125,000 men, with a reserve of 275,000 men. Among the fortified towns of B. are Antwerp, Charleroi, Philippeville, Ath, Menai, Namur, Ostend, Nieuwepoort, Ypres, Tournay, and Mons. Though still insignificant, the navy is increasing, and recently several large steam-vessels have been constructed, which are equally adapted for war or commerce.

Education.—As regards education, B. is said to rank higher than France or Austria, but the system is still in many respects defective. Since 1830 attendance at school has not been compulsory, and only of late years has the state succeeded to any extent in preventing the clergy from controlling public instruction. The sum assigned for education in the budget of 1874 was £388,064. There are four universities, at Brussels, Liège, Ghent, and Louvain, the last of which is Roman Catholic. There are also a large number of *Athénées* or national schools, for combined classical and commercial instruction; upwards of 50 *Écoles moyennes* preparatory to these; two training-schools for teachers at Liège and Nivelles; numerous technical schools, gymnasia on the German model, and normal *ateliers*. Among high-class æsthetic institutions are the Academies of Fine Arts at Brussels and Antwerp, the Museum of Painting and Sculpture at Brussels, and the Music Conservatories at Brussels, Liège, and Ghent.

Ethnography, Language, and Religion.—The population of B. is mainly composed of two distinct races—the Flemings, a Teutonic people, of whom there are some two and three-quarter millions, and the Walloons, a branch of the Celtic family, of whom there are about two millions. The former chiefly occupy the northern provinces, and have a language (*Flemish* or *Flemish*) closely allied to Dutch, from which indeed it differs chiefly in pronunciation and orthography: the latter dwell in the S. and S.E., and their speech is a dialect of the French, or, more correctly, it resembles the Northern French of the 13th c., and contains besides a large infusion of Spanish words, which of course date from the period of the Spanish rule. Flemish is still the language of the majority, and of some forty newspapers, as well as of the revived literature of the country, though French has long been the adopted speech of the court and the legislature, and therefore of society. B. is almost entirely a Roman Catholic state, there being only of other creeds some 13,000 Protestants and 1500 Jews. The smaller denominations, however, are not only tolerated, but a certain portion of the income of ministers of all churches is paid by the state. The head of the Roman Catholic Church in Belgium is the Archbishop of Mechlin, and there are five bishops—viz., those of Bruges, Ghent, Namur, Liège, and Tournay.

Literature and Painting.—In B. there are two distinct literatures, Flemish and French, the one eminently a national growth, the other an exotic, and the favoured child of circumstance. A healthy revival of the former took place in the beginning of the present century, inaugurated by Jans Franz Willems, whose example has been followed by some of the ablest writers of the country, and at last there seems the prospect of a literature for B. which shall be a pure and independent counterpart of the national life. This is seen in the formation of many literary societies, in the extensive publication of old Flemish remains, in the general cul-

tivation of the vernacular, and not less in the opening of the magnificent national theatre at Antwerp in 1874 for the production of Flemish plays. Among the celebrated names belonging to the country in mediæval and modern times are Jacob van Maerlant, 'father of the poets of the Netherlands'; Philip de Comines, Schott, Strada, and Altmeyer, in history; Lipsius, Drusius, and Oudenarde, in philosophy and criticism; Simon Stevin and Quetelet, in mathematics; Willems, the originator of the Flemish 'movement'; and among the later Flemish writers, Hendrik Conscience, and Tony Anton Bergmann, novelists; De Geyter, Vervier, Rens, Iliel, and Anthelmis, poets; and Boone, Heremans, and Sabbe, critics and political writers. Founded by Hubert and Jan van Eyck, the old Flemish school of painting is famous for its scrupulous drawing and glories of colour, but in the choice of subject it often shows an indifference to dignity, and even occasionally a preference for the vulgar and commonplace. Its chief ornaments are Rubens, Vandyk, Jordaens, and Teniers. A society of painters was in existence at Antwerp as early as 1442, and the celebrated Academy in the same city was founded in 1510. In the modern art revival the principal names are De Keyser, Wappers, Gallait, De Biefve, and Verboekhoven. Among the sculptors of B. are Geefs, Simons, Jehotte, and Fraikin; among the engravers, Calametta, Brown, and Meunier. In music it can also show a long list of distinguished composers and instrumentalists.

History.—The earliest information concerning the country now called B. is derived from the Romans, who found it inhabited by Celtic and German tribes, whom they named *Belgæ* (q. v.), probably thus giving a general application to the name of some particular tribe. The territory, as *Gallia Belgica*, became one of the three divisions of Gallia, and remained under Roman domination till A.D. 409, when the Franks, who had been settled there since the time of Julian, made themselves masters of the region. After the conquest of the rest of Gaul by Chlodwig, it shared the fortunes of the Frankish kingdoms which owed their existence to his sword, more particularly of the Neustrian kingdom, to which it mainly belonged. By the treaty of Verdun, 843, certain parts (now Flanders and Artois) went to the Karolings of the newly-formed kingdom of France; but all the N. (including Brabant) was included in Lotharingia, a strip of land extending from the Mediterranean to Holland, and named after Lothar, a grandson of Charlemagne, who in the division of the great empire of the West had obtained this region, together with Italy and the title of Emperor. Lotharingia soon lost kings of its own, and its possession was often disputed between the Karolings of France and the kings of Germany. In the confusions that ensued, the land was broken up into various dukedoms, counties, earldoms, and other petty sovereignties. Of these, the richest was the County of Flanders, which, on the extinction of the line of counts in 1385, went to the house of Burgundy. Through marriage, inheritance, and purchase, the rulers of Burgundy, by the beginning of the 15th c., had acquired all the other provinces of the Netherlands, and, with the view of raising up a great and undivided power between France and Germany, had curtailed the privileges and violated the charters of those growing towns, in which a republican spirit was becoming too visible. This policy was pursued to an extreme of tyranny by Charles the Bold, till the busy communities found their wealth appropriated and their freedom crushed. Relieved from a centralised despotism only by the death of the Duke (1477), they rallied round his only daughter, Maria, to rescue her from the grasp of the crafty Louis XI. of France; obtained from her a liberal charter; and finally selected for her the husband whom her father had opposed, the Archduke Maximilian I., thus making over the Netherlands to the house of Hapsburg. Of this union was born Philip the Fair, who married Joanna, daughter of Ferdinand and Isabella of Castile and Aragon, in 1496, and who was succeeded by his son, the celebrated Charles I. of Spain, better known by his loftier title of Karl V., Emperor of Germany. In 1555, Karl V., after a reign marked by gross extortion and cruel persecution of the early reformers, abdicated in favour of his son, Philip II., who by his marriage with Mary Tudor (1554) had already become titular king of England. Animated by the fiercest hatred of the new faith, the relentless cruelty of Philip stirred up the provinces (1568-1609) to a strenuous defence of religion and liberty. (See ALBA.) The seven northern or Teutonic provinces were alone successful, however, in throwing off the Spanish yoke, a result chiefly due to

the sagacious leadership of William, Prince of Orange. (See NETHERLANDS.) The southern or more Celtic provinces, mainly inhabited by Catholics, remained in the power of Spain, and were ceded by Philip, in 1598, to his daughter Isabella, wife of the Archduke Albert, when they were formed into a separate kingdom. On the death of Albert (1621), the Austrian Netherlands reverted to Spain, and in the wars of the declining monarchy the counties of Artois, Thionville, and other districts (1659), and of Lille, Charleroi, Oudenarde, Courtray, &c. (1668), were wrested from her by the rapacity of France. Only a small portion of these and other conquests was restored to Spain at the Peace of Ryswick in 1697. In 1700, on the death of Charles II. of Spain, the country became a great theatre of the war of the Spanish succession, which was concluded by the Peace of Utrecht (1713-14) placing B. once more under Austrian rule, with, however, one very important condition annexed, known as the *Barrier Treaty*, in virtue of which, the right of garrisoning the fortresses along the French border, and of closing the Scheldt, was vested in the States-General. During the Austrian war of succession (1744-48), the French, under Marshal Saxe, conquered nearly the whole of the country, but had to restore it at the Peace of Aix-la-Chapelle in 1748. It then remained undisturbed throughout the reign of Maria Theresa, and regained much of its former prosperity. But its peace was again interrupted on the succession of Joseph II., son of the 'Empress-queen,' who, in contradiction of his express promise, withdrew the legal privileges of the states secured by the Barrier Treaty. A revolt followed, the foreign troops were defeated, Brussels was captured, and in 1790 the provinces of the Austrian Netherlands proclaimed their independence. The differences between the aristocratic and democratic parties among the insurgents encouraged the Austrians to attempt the re-conquest of the land before the close of the year. They were successful; but in a short time republican France fiercely challenged the monarchies of Europe. The Austrian Netherlands was the first great battlefield, and B. was finally conquered by Pichegru in 1794. Later it was annexed to France by the treaties of Campo-Formio and Luneville, and remained in all respects a province of that country under the Consulate and the Empire, until the Peace of Paris (March 30, 1814), when, along with Holland (long since a separate state), it was put under the government of William Prince of Orange, who, on the 23d March 1815, took the title of King of the Netherlands. The want of political and religious sympathy between Protestant Holland and Catholic B. soon showed itself, and a breach of all good feeling was created by the one-sided character of the new constitution. All its important provisions were in favour of Holland; the Dutch language was adopted for administrative purposes; the clergy of B. were deprived of their privileges, and the poor were severely taxed; while the Belgians, although the more numerous people, were almost excluded from any share in the government. Liberals and Catholics were alike dissatisfied, and the French revolution of 1830 was a signal for an expression of their discontent. After a peaceful attempt to gain a separate administration, which was foiled by the obstructive delay of the Dutch deputies, the exasperated Belgians rose in open insurrection. The authorities of the state were speedily overthrown, and on October 4, 1830, B. was proclaimed independent by a provisional government. A national assembly was summoned, and the Baron Surlet de Chokier was appointed regent, only 13 votes out of 187 declaring for a democracy. On the 19th December the London Congress met and resolved to recognise the autonomy of B., and on the 4th of June following Prince Leopold of Saxe-Coburg was elected king by the Belgian Assembly. The selection was a happy one for B., and henceforth the peace of the country may be said to have been established, the constitution firmly securing the freedom of religious worship, of the press, and of education. Meantime Holland declared war against B., but was checked by the interference of England and France. On the 15th November 1831 a conference of the five great powers was held in London, and the 'definitive treaty' was drawn up, the twenty-four articles of which were duly accepted. The treaty provided (Art. 24) that B. and Holland should divide Luxembourg and Limburg between them. This Holland refused to do, whereupon an English and French fleet having blockaded the Scheldt and the Dutch coast, and a French army having captured the citadel of Antwerp, Holland was forced to yield,

and a treaty ratifying the severance of the disputed territory was signed in London, April 19, 1839. Leopold I. died December 10, 1865, and was succeeded by his son, Leopold II., who continues to abide by the wise policy of his father, holding himself entirely aloof from party strife. Although the country in 1875 was considerably disturbed by religious riots, there was the evidence everywhere visible of a national sentiment animating both Liberals and Ultramontanes, who honestly seek the triumph of their opinions only by constitutional means. At present, the great question in B. (as in many other countries) is whether education is to be controlled by the State or the Church. See Juste, *Histoire de Belgique* (5th ed. 1868); Oppelt, *Histoire Générale et Chronologique de la Belgique de 1830 à 1860* (1861); Malon, *Notice Historique sur les Finances de la Belgique* (Par. 1868); *Statistique Générale de la Belgique* (7 vols. Bruss. 1865-74); Prof. Van Bommel, *Belgique Politique et Sociale* (1874); and Paul Frédéricq, *Essai sur le Rôle Politique et Social des Ducs de Bourgogne dans le Pays-Bas* (Ghent, 1875).

Belgorod (Russ. *Bialgorod*, 'white town'), a town in the province of Kursk, Russia, on the Donez, founded in 1593, has manufactures of leather, soap, candles, &c., with considerable trade in wax, bristles, and hemp. Pop. 13,168.

Belgrade (Slav. 'white fortress,' of which the Ger. name *Weissenburg* is only a translation), the capital of Servia, situated on the S. side of the confluence of the rivers Save and Danube, is a strongly fortified and important town. To the N. of the citadel, which commands the Danube at that point, is the Water town, to the W. lies the Raitsen town, and to the E. and S. the Palanka. B. is a great emporium for the exchange-trade of Austria, Servia, Turkey, and Rumania. It imports for itself and the Principality corn, horses, wine, beer, tobacco, leather, dried fish, piece-goods from England (to the value in 1871 of £30,000), coffee, rice, &c. Its great export trade is in pigs (one half of the export trade of the country), wool, and salt. B. has manufactures of arms, cutlery, silk goods, carpets, and similar materials. There were only two banks in the city in 1872. The population of the city, excluding the garrison, was in 1874 estimated at 27,603. B., in virtue of its position, has been the scene of many a fierce battle and siege, hence, probably, its Turkish name, *Darol-fihud* ('house of the holy war'). We first hear of it in ancient times under the name of *Singidunum*, when it was the headquarters in Upper Moesia of the 4th Legion (*Flavia Felix*). Wrested from the Eastern emperors in the 5th c. by the Huns and Ostrogoths, and again by the Magyars in the 11th and 12th centuries, it next passed into the hands of the Bulgarians and Servians. The Turks captured it in 1521, the Imperial forces in 1688, the Turks again in 1690, and in 1717 it surrendered to Prince Eugene. By the treaty of B. (1739), known as the 'Eternal Peace,' it was restored to the Turks, was again captured by the Austrians under Loudon in 1789, and once more handed back to the Turks at the peace of 1791. Since then it has shared the fortunes of the restless state of which it is the capital. The Turkish garrison that formerly held the citadel and overawed the city was withdrawn in 1866.

Belial, properly **Beli'al** (Heb. ? 'good for nothing'), in the Old Testament, is not to be understood as a proper name; *man of or son of B.* is simply a Hebraism for a worthless, lawless fellow. In the New Testament (2 Cor. vi. 15) it is used as a proper name, and applied to Satan or Antichrist, and hence it came to be represented in this light in our translation of the Old Testament.

Belief is a name given to a large class of widely-differing mental states, which, however, agree in implying an intellectual operation, more or less directly connected with some proposed action, and greatly liable to be influenced by the feelings. B. was at one time (e.g., by Locke in chapter on Probability, *Essay on the Human Understanding*) applied to affirmative judgments which come short of demonstrative knowledge, and was described as the purely intellectual assent of the mind to such propositions as conform to personal or reported experience. The retentive analytic power of the mind, however, while it secures the truth or accuracy of B., is far from constituting B. itself. Hume perceived this to some extent when in his *Inquiry* he pointed out that B. was distinguished from imagination by some 'feeling or senti-

ment.' As Locke had described the degrees of B. by names, such as assurance, confidence, which includes an element of feeling, so Hume resolves this 'sentiment of B.' into 'a more vivid, lively, forcible, firm, steady conception of an object' than is afforded by imagination; and he gives some valuable illustrations of the joint operation of the affections and the intellectual associations in producing B. Reid unfairly ridicules Hume as teaching that B. depends on the intensity of ideas, offers no explanation of B. generally, and regards particular beliefs, e.g., in memory, causation, testimony, and an external world, as original and undecomposable powers of the mind. It is now generally seen that, while we believe many things (e.g., as astronomical facts) which do not directly influence our actions, and while the force of passion frequently leads us to act in opposition to our beliefs, yet the characteristic of B. is that we are prepared to act on the assumption of its truth. Hence, a large number of early beliefs is generated by man's spontaneous and instinctive tendencies to activity. Gradually, by a system of trial and error, by an enlarged experience of the sources of pain and pleasure, these impulses to act, and in acting to believe, are in some directions starved out by disappointment, in others controlled into habitual dependence on the observed uniformities of nature. To perceive the completeness of evidence, to draw a necessary inference, or to recognise a self-evident proposition, is, therefore, not to believe, but is only the intellectual part of accurate B. The mind then throws itself into the active confident state of B., and according to the intensity with which an object is desired, the fulness of the connection established between the end and the means, the general vigour and elation of the system, proceeds energetically to act out the ideas which have in many cases been for long the subject of intentions or resolutions. B. is therefore well defined by Professor Bain as 'a growth or development of the will under the pursuit of intermediate ends.' This at once suggests how powerful an influence the mere anticipation of pleasure, the shrinking from pain, abnormal excitement or normal temperament of the individual, exercise upon B. This psychological account of B., which corresponds with the pain, depression, and fatigue which attend the opposite state of doubt, is wholly independent on the metaphysical theories regarding the origin of the most general and elementary beliefs. It is, however, closely connected with the question of responsibility for B., of which it exhibits the partly voluntary character. Were B. not so largely colored by feeling, and supported by being asserted in action, it would be foolish, as well as wrong, to attempt the propagation of particular opinions by penalties and rewards. On the other hand, the great security of science (which makes it independent of patronage) is, that its results are constantly becoming the basis of human activity.

Belisarius (Slav. *Beli-tsar*, 'White Prince'), 'one of those heroic names familiar to every age and to every nation,' was born at Germania, in Illyria, about A.D. 505. On the accession of Justinian (527), B. became general of his Eastern armies, and after almost unvarying success, made peace with the Persians on the death of Cobad. At this time he married Antonina, a woman of birth and profligate character, whose power over her husband has alone left blots on his fame, and who was alternately favourite and the foe of the Empress Theodora. In 532 a riot against Justinian was excited in Constantinople by the union of the rival factions, striped 'blue' and 'green,' whose mutual hatred long destroyed the peace of the city; and Justinian's life was saved by B., who displayed that unflinching loyalty to his sovereign which so conspicuously characterised him through life. In 533 Justinian despatched an expedition to Africa, ostensibly to assert the rights of Hilderic and punish the usurper Gelimer, but in reality to restore to the empire the lands which the Vandal, Genseric, had taken from it a century before. At the head of 15,000 men B. landed at Caput Vada, twice defeated the Vandals, reduced Carthage, and in three months achieved the conquest of Africa. In 534, with Gelimer as his captive, he returned home, and the first triumph ever witnessed in Constantinople was celebrated in his honour. The ambition of Justinian now (535) prompted him to attempt the recovery of Italy. He took advantage of the dissensions of the Ostrogoths, and demanded the abdication of King Theodatus. B. conquered Sicily, took Naples, entered Rome, which he defended for a year (537-38) against the new king, Vitiges, and after the recall of Narses, effected by stratagem the surrender of Ravenna.

Vitiges was captured, and the Ostrogothic kingdom subdued (539). After two years spent in the defence of the East, B. was recalled, disgraced, and heavily fined by the emperor, whose baseness or jealousy induced him to lend his ear to the slanders of malicious rumour. Yet he was again despatched to Italy to oppose Totila, the Ostrogothic king; and though he failed, from inadequate supplies, to raise the siege of Rome, or seriously to repulse the foe, he succeeded for five years (544-48) in skillfully keeping their hostility in check. B.'s last victory was gained (559) in repelling an invasion of the Bulgarians. In 563, B., for alleged complicity in a conspiracy against the life of Justinian, was again disgraced, and his fortunes were sequestered; but in the following year his innocence was acknowledged, and his honours restored. He died A.D. 565. The statement, derived from a work of Tzetzes, a monk of the 12th c., that B. was deprived of his eyes and reduced to beg his bread in the streets, is generally discredited. The works of Procopius, the secretary of B., are our chief authority for the events of this period; and the more romantic though fictitious version of the close of B.'s life is embodied in Marmontel's *Bélisaire*, and defended in Earl Stanhope's *Life of B.* The fictitious incident in B.'s life also forms the subject of a picture, now in the Leuchtenberg gallery at St Petersburg, which was the first famous work of the French painter Gérard.

Belize. See BALIZE.

Beljurie, a town in the British district of Moradabad, Rohilkhand division, N.W. Province, India. Pop. in 1872 (including a part of Kashipur), 8253.

Bell, Andrew, was born at St Andrews (1753) and educated at its university. After a visit to America he entered into holy orders, and officiated as Episcopal pastor at Leith. He subsequently settled in Madras, where, by lecturing and by filling various clerical offices, he made a fortune of nearly £26,000. At Madras he organised, on the monitorial system, and administered for six years, a military orphan asylum. In 1796 he returned to England, and in 1797 published his *Experiment in Education*. In 1798 Joseph Lancaster established a school in London, which was soon crowded by free scholars, and where the education problem was solved by the crude expedient of employing children to teach children. The scheme became popular, and issued in the formation of the British and Foreign School Society. Lancaster, however, refused to admit into his religious instruction anything peculiar to any sect or party, and this alarmed the Church of England. A rival society, the National, was formed, of which B. was the champion, and the country was divided into the followers of B. and the Church and of Lancaster and the Bible only. Both societies still exist, and have done much good, though they have long outgrown the systems they were formed to promote. B. handed over to trustees £120,000 to be devoted to education. Schools bearing his name were founded in Edinburgh, St Andrews, Glasgow, Leith, Inverness, Cupar, and Aberdeen. In 1874 B.'s trustees offered £10,000 to the Universities of Edinburgh and St Andrews to aid in the foundation of Chairs of the Theory and Practice of Teaching. B. died at Cheltenham, 28th January 1832.

Bell, Benjamin, author of *A System of Surgery*, born at Dumfries, 1749, studied medicine at Edinburgh, where, after visiting the medical schools of Paris and London in 1770, he established himself in 1772, and entered upon an extensive practice. B. died April 4, 1806. His *System of Surgery* has passed through seven editions.

Bell, Sir Charles, an eminent surgeon, author of *The True Theory of the Nervous System*, was the son of the Rev. William Bell, an Episcopal minister. He was born at Edinburgh in 1774, and received his education at the High School and the University of his native city. He studied anatomy under his brother John, whom he assisted in his lectures and demonstrations. In 1806 he removed to London, where, in 1811, he began to lecture on anatomy and surgery at the Hunterian School in Windmill Street. To obtain a knowledge of gunshot wounds, he repaired to Brussels in 1815, after the battle of Waterloo, where he did great service in attending to the wounded. His subsequent career in London was brilliant, his lectures being attended with great and deserved success. In 1831, on the accession of William IV., he received the honour of knighthood.

In 1836 he was elected to the Chair of Surgery in the Edinburgh University, for which class he published his *Institutes of Surgery* (Edinb. 1838). B. died suddenly at Hallow, Worcestershire, on May 27, 1842. He wrote numerous treatises and works, the more important of which are his *Nervous System* (1824); his *Animal Mechanics* (1828); the *Anatomy of Expression* (1st ed. 1806; posthumous edition 1844); and the *Bridge-water Treatise on the Hand* (1834). An interesting work recently published (*The Correspondence of Sir Charles B.*, Lond. 1870) shows him to have possessed a keen, courageous, yet sensitive spirit.

Bell, George Joseph, a distinguished Scottish lawyer, brother of the foregoing, was born at Edinburgh, 26th March 1770. His knowledge of commercial law in general, but especially of the laws relating to bankruptcy, was exact and profound. In 1822 he was appointed to the Chair of Scots Law in Edinburgh University; he was appointed a member of the commission for simplifying the mode of procedure in the Court of Session; clerk of the Court of Session in 1831; and chairman of the Royal Commission for inquiring into the state of the law in general in 1833. He died 23d September 1843. B.'s chief works are, *Commentaries on the Law of Scotland*, and on the *Principles of Mercantile Jurisprudence* (Edinb. 1810; 6th ed. by Shaw, 1858); *Principles of the Law of Scotland* (Edinb. 1829; 5th ed. by Shaw, 1860); *Illustrations of the Principles of the Law of Scotland* (3 vols. Edinb. 1838); *Commentaries on the Recent Statutes relative to Diligence or Execution against the Movable Estate, Imprisonment, Cessio Bonorum, and Sequestration in Mercantile Bankruptcy* (Edinb. 1840).

Bell, Henry, who introduced steam-navigation into Europe, was born at Torphichen, Linlithgowshire, April 7, 1767. After acquiring a knowledge of mechanics in Scotland, he went to London, and wrought with the famous engineer Mr Rennie. In 1790 he returned to Scotland, and commenced business as a carpenter at Glasgow; removed to Helensburgh in 1808, and kept the principal inn there, but occupied himself with experiments in mechanics. In January 1812 he launched the *Comet* on the Clyde, the first steam-vessel on European waters. The engine, at first of three-horse power, was afterwards increased to six. Although Mr Miller of Dalswinton, in Dumfriesshire, in 1788, and Mr Fulton on the Hudson river, New York, in 1807, had each succeeded in propelling a boat by steam, it is really to B. that the practical introduction of steam-navigation is due. He died at Helensburgh, November 14, 1830. At Dunglass, on the Clyde, a monument has been erected to his memory.

Bell, John, an eminent English sculptor, born in 1811, first exhibited in 1832, and has produced numerous admirable works in monumental, religious, and imaginative art. His first productions were classical in subject and style of treatment, but soon abandoning the traditions of the ancients, he sought original inspiration, chiefly in the characters of Scripture and of the national history. His *Babes in the Wood* and *Antionomeda* were the chief attractions in the 1851 Exhibition; while among his best-known statues are *Sir Robert Walpole* (St Stephen's Hall), *Wellington* (Guildhall), and the *Guards' Memorial*. His last great work was a group (*The United States Directing the Progress of America*) for the base of the Prince Consort memorial.

Bell, John, an eminent Edinburgh surgeon, brother of Sir Charles and of George Joseph B., was born in Edinburgh, May 12, 1763. He studied under Black, Cullen, and Monro; began lecturing in his native city on surgery and anatomy in 1786; and after a laborious and earnest career, died of dropsy at Rome, April 15, 1820. B.'s principal works are his *Anatomy of the Human Body* (3 vols., pub. 1793, 1797, 1802); *Engravings of the Bodies, Muscles, and Joints* (3d ed. 1794); *Discourses on the Nature and Cure of Wounds* (1793-95); *Principles of Surgery* (3 vols. 1801-8; new ed., edited by Sir Charles B., 1816); and *Letters on Professional Character and Manners*.

Bell, John, a well-known Scotch traveller in Asia, was born at Campsie in Stirlingshire in 1691, studied medicine, and went to St Petersburg in 1714, where he was appointed physician of a Russian embassy to Persia. B. returned to Russia in 1718, and was sent by the Czar to China in 1719, and in 1737 to Constantinople, where he became a merchant. In 1747 he returned to Scotland, and died at Anternemy, July 1, 1780.

He published his *Travels from St Petersburg to Various Parts in Asia* at Glasgow in 2 vols., 1763, a work much admired for the directness and simplicity of its style and narrative.

Bell, Robert, a meritorious critic and editor, was born at Cork, 10th January 1800, became the editor of the *Atlas* in 1829, and retired from it in 1841. He died April 12, 1867. B.'s services to contemporary literature were numerous and valuable, from the honest, careful, and discriminating manner of their performance. He is also a dramatist and novelist of merit. His *History of Russia* (Lardner) and *Outlines of China* are most useful handbooks. But he will be best remembered for his annotated edition of the English poets, begun in 1854 (the last issue is that by C. Griffin & Co., Lond.), which is excellent for the Elizabethan and later writers. His *Chaucer* is not a good text, nor does he seem to have been strong in the scholarship of the English language. B.'s series has nothing equal to the *Chaucer* of Morris or the *Gray* of Mitford in the new edition of the Aldine poets by Bell & Daldy, but it is still a respectable monument of honest industry.

Bell, Thomas, an eminent living naturalist, was born at Poole, Dorsetshire, October 11, 1792; studied at Guy's and St Thomas's Hospitals, 1814, and passed as surgeon in 1815. He lectured at Guy's Hospital from 1816 to 1860; was elected to the chair of Zoology in King's College, London, 1832; was president of the Ray Society from its institution in 1844 till 1859, secretary of the Royal Society from 1848 till 1853, and president of the Linnæan Society from 1853 to 1861. He is also corresponding member of many foreign scientific societies. Among his numerous contributions to science are *History of British Reptiles* (1829); *History of British Mammalia* (1836); *History of British Stalk-eyed Crustacea* (1853). These formed portions of Van Voorst's series of British Natural History. A monograph of the *Testudinata*, folio, commenced in 1833, is still uncompleted. B. has also contributed numerous valuable papers to the *Transactions* of the several societies with which he is connected. He is now (1875) engaged on an edition of White's *Natural History of Selborne*, to which much new matter is to be added. Lord Selborne is to furnish a chapter on the antiquities, and Mr Curtis one on the geology of the district.

Bell'a, a rising town in the Italian province of Basilicata; pop. about 6000.

Bella, Stefano Della, an Italian engraver, born at Florence, 18th May 1610. His works, upwards of 1400, embrace almost every subject, historical incidents, hunting-scenes, landscapes, sea-pieces, animals, and ornamentation, and are distinguished no less by delicacy of touch than by careful manipulation. Many were executed in France by the order and under the patronage of Richelieu. On his return to Florence he was loaded with honours by the Grand-Duke. He died 12th July 1664.

Belladonna (*Atropa Belladonna*), a plant belonging to the natural order *Atropaceæ* (q. v.), is a herbaceous perennial, from 2 to 6 feet in height, with bell-shaped flowers of a lurid purple. The berries, which are about the size of cherries, are, when ripe, of a black, shining colour, and have a sweetish or mawkish taste; but, like the rest of the plant, the flower has a disagreeable 'heavy' smell. B. is a native of the S. of Europe, and is narcotic and poisonous in all its parts, death being preceded by dryness of the throat, dilatation of eyes, dimness of sight, paralytic trembling, loss of sensation, stupor, and delirium. It is of use in medicine for soothing irritation and pain, and is employed by oculists for the purpose of dilating the pupil during examination of the eye, and for diminishing the sensibility of the retina to light. It owes its activity to the alkaloid *atropine*, which



Belladonna.

is also a powerful poison, and is used for the same purpose as the extract of the plant. The juice of B. is said to have been at one time employed by ladies for staining their skins! hence the name B. (beautiful lady). The other popular names—Dule (Fr. *dévil*, grief), and Deadly Nightshade, express the popular appreciation of its fatal properties. Its botanical generic name is from *Atropos*, one of the Fates. There are several other species in S. America which possess similar properties.

Belladonna Lily (*Amaryllis Belladonna*), a fine species of *Amaryllis*, a native of the Cape of Good Hope and the W. Indies; commonly cultivated in English gardens.

Bellamy, Jakob, a young Dutch poet, one of the restorers of the national literature of Holland, was born in humble circumstances at Vliessingen (Flushing), November 12, 1757. Assisted in his education by friends, he went to the University of Utrecht to study for the Church, but devoted his attention mainly to poetry. His first effusions, *Gezangen Mijner Jeugd* (Amst. 1782), were lively and amatory; the *Vaderlandsche Gezangen* (Utr. 1785) breathed a thoroughly patriotic spirit. The Dutch put great value on a poetical romance of his, *Rosje* (Utr. 1784). A third edition of B.'s poems appeared in 1842. He died 11th March 1786.

Bell Animalcules, the popular name of a genus of Infusorian animalcules, scientifically known as *Vorticella*. Each animalcule consists of a bell-shaped body or *calyx*, borne on a stalk, which is rendered contractile by the presence of a spiral fibre. By aid of this structure the Vorticella can quickly contract itself upon its stem when alarmed or irritated. These animalcules occur in groups, and are generally found attached to aquatic plants. The margin of the bell or calyx is fringed with vibratile filaments termed *cilia*. These animalcules reproduce themselves by *fission*, by *gemmation* or *budding*, and by a process of *encystation*, allied in many points to the sexual generation of higher animals. See also INFUSORIA and PROTOZOA.

Bellarmin, Robert, Cardinal, a famous Roman Catholic theologian, was born at Monte Pulciano, Tuscany, October 4, 1542. He entered the order of Jesuits in 1560, and distinguished himself by his study of all departments of theology. In 1569 he was ordained priest, and was appointed Professor of Theology in the following year at Louvain, where he taught with such success, that even Protestants came from England and Holland to hear his lectures. After seven years spent in the Low Countries, he returned to Italy, and in 1576 was chosen by Pope Gregory XIII. to fill the chair of Polemical Theology in the new college founded by that pontiff in Rome. In 1599 he was made a cardinal, and in 1602 Archbishop of Capua; but honourably resigned this dignity in 1605 when made keeper of the Vatican Library by Paul V. He would probably have been Pope, but for the fears entertained by the cardinals that the order of Jesuits would become too strong. B. died at Rome, September 17, 1621. B. was the main defender of the Church of Rome against the attacks of the Reformers, and according to Bayle, was the best controversialist of his age. A work in which he had advocated the supremacy of the Pope over kings (*De Potestate Pontificis in Temporalibus*) was condemned respectively in Paris, in Venice, and in Mainz. But his masterpiece is the *Disputationes de Controversiis Fidei, Adversus hujus Temporis Hæreticos* (3 vols. Rome, 1581; Ingolst. 1587; Paris, 1688; and Mainz, 1842). It is substantially his lectures as Professor of Polemical Theology, and exhibits method, moderation (in language), learning, and subtlety, but is charged by Protestants with unfairness, and a determination to prove his point at all hazards. Despite his eminent services to his Church, no Pope has as yet authorised his canonisation. The other works of B. do not require mention. A collected edition was published at Cologne in 7 vols. 1619, and another at Venice in 5 vols. 1721. B.'s life has been several times written. See Fulgatti, *Vita del Cardinal. Rob. Bellarmino* (Rome, 1624); Bartoli, *Della Vita di Rob. Cardinal. Bellarmino* (Rome, 1678); Frizon, *Vie du Cardinal Bellarmin* (Nancy, 1708).

Bellary, the chief town of a district of the same name in the province of Madras, British India, 270 miles N.W. of Madras, and 190 S.E. of Haidarabad. It is an important military station, and consists of extensive cantonments, and a native town with about 35,000 inhabitants. B. is overlooked by a fort, which

stands on a rock 450 feet high.—The district of B. has an area of 11,007 sq. miles, and a pop. (1872) of 1,668,006, of whom more than 1,500,000 were Hindus. It is the healthiest portion of Southern India, being sheltered by the Ghauts from the S.W. monsoon, and being entirely free from the N.E. one, owing to its distance inland. The yearly rainfall ranges from about 12 to 26 inches. B. is traversed by the Madras and Bombay Railway.

Bell-Bird (*Arapunga alba*), a genus of Passerine birds included in the section *Dentirostres*, and in the sub-family of *Gymnoderina* or Fruit-Crows. The B.-B. is found in Guinea and other parts of S. America, and is so named from the notes of its voice mimicking the clear tones of a bell. Waterton says this bird's notes may be heard at a distance of three miles, and it is one of the few birds which sing during the heat of the day. A peculiar tubular fleshy appendage springs from the base of the bill, which is broad and depressed in shape. The males are of snow-white plumage, and about twelve inches in length.

Bell, Book, and Candle, a phrase used to describe a mode of the greater excommunication which seems to have prevailed in the Church of Rome as early as the 8th c. After reading the sentence of exclusion against the person excommunicated, not only from the table of the Lord, and from other privileges of Christian communion, as in the lesser excommunication, but from many social and political rights and privileges, the bishop and clergy extinguish their candles, shut the book from which the excommunication is read, and cause the church bell to be tolled as if for the death of the obstinate offender. See EXCOMMUNICATION.

Belle'-Alliance, a farm 13 miles S. of Brussels, where the French centre was stationed at the battle of Waterloo, June 18, 1815. Each of the contending nationalities has named this battle differently: the British, Waterloo; the French, Mont-Saint-Jean; and the Prussians, B.-A.

Bellegarde (the 'fair guard'), a hill-fortress in the French department of Pyrénées Orientales, commanding the pass into Spain over the Col de Portuis, on the road from Perpignan into Catalonia. It was first made formidable by Louis XIV., and has been several times taken and retaken in the Franco-Spanish wars.

Belle Isle, a small island about 15 miles N. of Newfoundland, and the same distance E. of Labrador, is known chiefly as giving the name to the strait which separates Labrador and Newfoundland.

Belleisle-en-Mer, the largest and most important island on the S. coast of Bretagne, is included in the French department of Morbihan, and situated 34 miles N.W. of the mouth of the Loire. Its greatest length from N.W. to S.E. is 12 miles, and its greatest breadth 7. The inhabitants, who are chiefly engaged in pilchard-fishing, numbered in 1872, 10,804. The chief town, *Le Palais*, fortified and situated on the coast, with a population of 5456, has steamboat communication with Nantes and L'Orient. B., which was known to the Romans as *Vindilis*, has some 'Druidical' remains. By the 11th c. *Vindilis* had changed into *Guedel*, and at a later period it received its present name. The island has belonged in turn to the Dukes of Bretagne, the Counts of Cornouailles, the monks of Quimperle, Cardinal de Retz, the finance minister Fouquet, whose grandson, Marshal Belleisle, finally sold it to the French crown.

Belleisle, Charles Louis Auguste Fouquet, Comte, afterwards Duc de, a French marshal and diplomatist, was born at Villefranche (Rouergne), 22d September 1684. He entered the army at an early age, distinguished himself at the siege of Lille (1708), took part in the Spanish campaign of 1719, and in 1732 had risen to the rank of Lieutenant-General. Under Marshal Berwick he captured Treves and Trarbach in 1734, and signalled himself at the siege of Philippsburg. The peace of 1735, by which Lothringen fell to France, was mainly B.'s work. Cardinal Fleury had boundless confidence in his capacity. Before the outbreak of the Austrian war of succession, B. visited the chief courts in Germany in the interest of the Bavarian elector, whom France desired to succeed to the imperial throne instead of Maria Theresa. Along with Broglie, at the head of a French army he invaded the Austrian territories, captured

Prague 26th November 1741, but, owing to the policy of Prussia, was forced to retreat to the Eger, 17th December 1742. In 1744, while on a diplomatic journey to Berlin, he was made prisoner at Elbingerode in Hanover, and sent to England, where he was detained for a year. Appointed commander-in-chief of the French army of Italy in 1746, he successfully defended the French frontier against the Austrians and Sardinians, and was in consequence made a Duke and Peer of France. In 1755 he was placed at the head of the war administration, and remained there till his death, 26th January 1761. B. was certainly a man of considerable gifts, but his reputation was more shining than his merit. Carlyle, in his *Friedrich* (vols. iii. and iv.), is grimly sarcastic upon this 'sun-god' with his 'effulgences' and 'wide-winged plans,' &c., but his estimate is in the main just.

Bell'enden (Ballantyne) John, the chief Scottish prose author of his day. The exact place and date of his birth is unknown; but he matriculated at St Andrews in 1508, and afterwards entered the Church. He was a favourite at the court of James V., and wrote a *Topography of Scotland, Epistles*, and poems. His chief work in verse was his *Prohem of the Cosmographie*, designed for the instruction of the youthful monarch. It was at the king's desire that B. undertook his principal work—the translation of Hector Boece's *Scotorum Historia* into the English dialect used in the Lowlands of Scotland. This was printed at Edinburgh in 1536—the very year of Boece's death—under the title *Hystory and Chroniklis of Scotland*. B.'s task was well executed; the translation, though a free one, is spirited, and even elegant. B. also rendered into the same dialect the first five books of Livy. These works gained high repute for their author; he was appointed by the king Archdeacon of Moray and Canon of Ross. B. became a Lord of Session in the reign of Mary; and was a zealous opponent of the Reformation. He died at Rome in 1550. A reprint of his translation of Boece was published at Edinburgh in 1821, and of the Five Books of Livy in 1822, both under the editorship of Mr Maitland.

Bellenden (Ballenden, Ballantyne, or Bannatyne), Sir John, of Auchinvole, has been sometimes confounded with the preceding. He was secretary to the Earl of Angus, and alone stood by that noble when tried in 1528 for high treason. The Earl was banished, but restored in 1543, when B. was knighted, and became Lord of Session, Director of Chancery, and Justice-Clerk of Scotland. Unlike his cotemporary, the Archdeacon, B. attached himself to the Reformation party. He was mixed up in the intrigues of Queen Mary, Darnley, and Bothwell; but the belief that he was concerned in the Rizzio murder seems to have been unfounded. B. died in the year 1577.

Bellenden, William, a Scotchman by birth, was a Professor of Humanity in the University of Paris, and an advocate in the Parliament there during the reigns of Mary and James VI. of Scotland. He was also engaged in diplomacy. His *Ciceronis Princeps* (a compilation of rules of government from Cicero's writings), or *De Statu Principis*, was published in 1608; his *Ciceronis Consul, Senator, Senatusque Romanus*, or *De Statu Reipublice*, in 1612; his *De Statu Prisci Orbis* (an account of the progress of ancient nations in religion, government, &c., from before the flood), in 1615. These three books appeared again together as *Bellendenus de Statu*. A more important work was his posthumous *De Tribus Luminibus Romanorum*, in which the politics, morals, and science of Cicero, Seneca, and Pliny were to have been digested. The work is confined to Cicero. (See Dr Parr's edition, published 1787, and Parr's Works, by Johnson, vols. i. and iii.)

Bellerophon (slayer of Belleros), son of Glaucus, King of Corinth. Repairing to King Proetus at Argos to obtain purification from the murder of his brother, the wife of that monarch, Anteia, or according to Apollodorus, Sthenobcea, conceived a criminal passion for him, which B. refused to gratify. On this she accused him to Proetus of having attempted to violate her, and demanded that he should be slain. Unwilling to slay his guest, Proetus dismissed him to the court of Iobates, King of Lycia, with a sealed message requesting that monarch to have him despatched. Iobates accordingly sent B. to kill the Chimæra, a monster composed of a lion in front, a goat (hence its name, *Chimæra*) in the middle, and a dragon behind. This

he did by the aid of his winged horse Pegasus, which raised him beyond the monster's reach, when he killed it with his spear. He was next sent to contend with the Solymi and the Amazons, both of whom he defeated. On his return he destroyed an ambush of the bravest Lycians, and Proetus, now perceiving that B. was the son of a god, gave him his daughter in marriage, and as a dower the half of his kingdom. Three children, Isander, Hippolochus, and Laodameia, were born to him; but just when he had reached the pinnacle of happiness, the gods (according to Homer) deprived him of reason. Mars slew his son Isander, and Diana his daughter Laodameia. There are other incidents in the myth recorded by ancient writers. The story was a favourite one with Greek artists, and in recent times Mr Fellows discovered in Lycia sculptures representing B. on Pegasus, and conquering the Chimæra.

Bellerophon, an extinct or fossil genus of *Gastropodous* Mollusca, representing the family *Atlantida* (order *Heterop*) of that class. The shell is symmetrical and convoluted, the lying in one plane. The whorls are few, and smooth or stunted. A dorsal ridge or keel exists on the convex or round margin of the shell. The aperture of the shell is wide, and notched or indented on its dorsal side. The Bellerophons— which *B. Argo* (Lower Silurian), *B. dilatatus* (U. Silurian), *B. Wenlockensis*, *B. expansus*, *B. bisulcatus*, and *B. subglobatus* (Devonian), may be taken as examples—range from the Lower Silurian to the Carboniferous formations. *Bellerophina*, found in the Upper Cretaceous rocks, is only doubtfully classified with the true Bellerophons.

Belles-Lettres. In French, the phrase *B.-L.*, when strictly used, embraces only 'Grammar, Oratory, and Poetry,' but both in France, and in the other countries that have adopted the term, its application is often extended so as to include æsthetics, and, within certain limits, criticism, or, generally, all the departments of literature bearing upon the emotions and the arts. The use of the term in English is co-ordinate with that of *polite literature*, a phrase which is no doubt vague as to its limits, but was obviously meant to embrace all kinds of literature that might be profitably read with a view to general culture rather than to special scholarship; such as poetry, history, fiction, criticism, &c. The diffusion of knowledge in modern times has necessarily widened to some extent the application of the term, which in fact is rather falling into disuse; but it is still held to exclude science, metaphysics, and theology, however brilliantly expounded.

Belle-ville, a suburb of Paris, in the arrondissement of Ménilmontant, within the military works recently erected. It has several manufactures, among others, of polished steel, varnished leather, cashmeres, &c. Paris has long derived its water-supply from springs at B., which is also noted as a great resort of pleasure-seekers. Recently it has acquired a sort of political notoriety. It is understood to be one of the headquarters of the Radical party in the metropolis, and its *ouvriers*, though displaying a singular absence of the national gallantry during the German siege of Paris, eagerly welcomed the bloody carnival of the Commune.

Belleville, capital of St Clair county, Illinois, fourteen miles S.E. of St Louis, possesses many manufactories and several good public buildings. Pop. 8146.

Belleville, the county town of Hastings, province of Ontario, Canada, on the Bay of Quinté, Lake Ontario, 48 miles W. of Kingston, and a station on the Grand Trunk Railway, has extensive timber trade, also several large foundries and manufactories. Pop. (1871) 7305.

Belley, a town in the French department of Ain, is now chiefly known for the excellent lithographic-stones found in its neighbourhood. It is the seat of a bishop, has a cathedral, a public library, a museum of antiquities, &c. Pop. (1872) 3534.

Bell-Flower. See CAMPANULA.

Belli'ni, a famous family of Italian painters, who are generally regarded as the founders of what is known as the Venetian school, inasmuch as they were the first to abandon that poverty and sharpness of outline which characterised the works of the earlier Venetians, and professed homage to that splendour of colour for which Giorgione and Titian, who were their pupils, became so deservedly famous.—Giacomo, or Jacopo B., the father, born in Venice, was one of the earliest painters in oil,

pointed for the Church of St John the Evangelist, Venice, and excelled in portraits. Only a single authentic work of his, a Madonna, has survived. He died about 1470.—**Gentile B.**, his eldest son, born 1421, died 1501, was employed with his brother Giovanni to decorate the council-chamber of the Venetian Senate. His 'Preaching of St Mark,' a work ranking among the finest of his time for colour and effect, is now in Milan.—**Giovanni B.**, born 1426, died 1516, was the most eminent artist of the family. His best works are altar-pieces in different churches in Venice, and a Madonna and Child, attended by angels, in the monastery of the Capuchins there. Giorgione and Titian were among his pupils, and carried to perfection the warm and brilliant style of their master.

Bellini, Vincenzo, an Italian composer, born at Catania, in Sicily, 3d November 1802, trained at the Conservatory of Naples, went to Paris in 1833, and died at Puteaux, near that city, 24th September 1835. He wrote scarcely anything but operatic music, his best-known works being *La Sonnambula*, *Norma*, and *I Puritani*. His style was to a great extent founded upon that of Rossini (who was ten years his senior), but with an exaggeration of that master's defects. His melodies are wanting in anything like vigour or originality, and his harmonies and accompaniments are generally thin and poor. See Pouglin's *Bellini* (1868).

Bellinzona, or **Bellenz**, a town in the canton of Tessin, Switzerland, on the left bank of the river Tessin, 12 miles N.E. of Ascona, and 8 from the head of the Lago Maggiore. It has considerable transit trade over the passes of St Gothard and St Bernard, and is periodically the seat of the cantonal government. The finest building in the whole canton is the Church of St Peter and Stephen, in B., partly of marble, and possessing good altar-pieces. The town has still several monasteries. In former times it was the scene of fierce and frequent conflicts between the Swiss and Italians. B. is protected from the overflows of the Tessin by a great dam more than 2400 feet long. The river is also here crossed by a granite bridge of ten arches, and upwards of 700 feet in length. Pop. (1870) 2501.

Bell's. See DAISY.

Bellmann, Karl Mikael, a popular Swedish lyrist, born at Stockholm, 24th February 1741, became court-secretary in 1775, and died 10th February 1795. The first effusions of his muse were religious, but he was soon drawn away into a dissolute career, and his later and more brilliant pieces are chiefly bacchanalian, idyllic, or humorous songs, for which he also furnished original melodies. The best specimens of his genius, which is of a rare order, are to be found in the collections prepared by himself: *Bacchanaliske Ordenskapitellets Handbibliothek* (1783), *Fredman's Epistlar* (1790), and *Fredman's Sångar* (1791). Numerous editions of his *Samlade Skrifter* have been published in Sweden, of which the most splendid is that by Carlen (4 vols. Stock. 1861). A monument was erected to his memory at Stockholm, 26th July 1829, and ever since the anniversary of its erection has been kept as a popular holiday. B.'s German translator, Winterfeld (1856), has happily described him as 'The Swedish Anacreon.'

Bellona, the goddess of war (Lat. *bellum*) among the Romans, and the wife of Mars, before whose chariot she hurried. Her worship (see Mommsen's *History of Rome*, b. i. ch. 13) was one of the oldest and most sacred forms of the national religion. She is represented as armed with a bloody scourge, and as inspiring a warlike enthusiasm impossible to resist. In her temple in the Campus Martius the senate gave audience to foreign embassies and to generals claiming a triumph. Her priests (*Bellonarii*) in her worship used to cut themselves with knives, and to offer up, and even sometimes to drink, the blood thus shed. The act, which became latterly merely symbolical, was performed on the 24th of March, which hence was known as *dies sanguinis* (day of blood).

Bell of a Capital, in architecture, is the vase or corbel of a Corinthian or composite capital denuded of the foliage which usually surrounds it. It is also called the drum.

Bellot, Joseph René, a distinguished French naval officer, was born at Paris, May 18, 1826. He is specially celebrated as an explorer in the Arctic Seas, to which region he went as a volunteer in both the expeditions sent out in search of Sir John

Franklin's remains—first, with Captain Kennedy in the *Prince Albert*, when he discovered B. Strait (q. v.); and, second, with Captain Inglefield, in H.M.S. *Phenix*, with which he never returned, having fallen through a crack in the ice, March 21, 1853. His *Journal of a Voyage to the Polar Seas made in Search of Sir John Franklin in 1851-52*, was published with a memoir of his life at Paris in 1854 (Eng. transl. 1855).

Bellot Strait, discovered by Kennedy and B., and explored by M'Clintock, is the narrow passage, about twenty miles long, which separates N. Somerset from Boothia Felix, and joins Prince Regent's Inlet with Franklin Channel.

Bellows. See BLOWING-MACHINES.

Bellows-Fish. A popular name applied to those *Acanthopterus* fishes known as sea-snipes, &c., from the extended pipe-like form of the jaw-bones. The sea-snipe (*Centiscus scolopax*) exemplifies this group; this species being found in the Mediterranean Sea.

Belloy, Pierre Laurent Buyrotte de, a dramatist and member of the French Academy, was born at St Flour, Auvergne, November 17, 1727. He was educated for the law at Paris, but a passion for the stage turned him aside from that profession. After pursuing his calling as a comedian for some time at St Petersburg, he returned to Paris in 1758, to see his tragedy *Titus* put on the stage. It was a failure. His next, *Zelmire*, had considerable success, but the play which brought about a brilliant epoch in the career of De B., was *Le Siège de Calais*, produced in 1765. Not to admire it was considered unpatriotic. *Gaston de Bayard* (1771) procured him membership of the French Academy. *Pierre le Cruel* (1772) was not a success when first put on the stage, but being revived after the author's death—which took place March 5, 1775—it took well, and has kept a good hold on the French stage. He died in comparatively straitened circumstances. Gaillard has published the *Œuvres de De B.* in 6 vols. 1779-87; and Firmin Didot *Œuvres Choies de De B.*, with a memoir of the author, 2 vols. Par. 1811.

Bell-Pepper, the fruit of *Capsicum grossum*, a native of India.

Bell-Rock, or **Inch Cape**, an old red sandstone reef, off the E. coast of Scotland, 12 miles S.E. of Arbroath, long a serious obstacle to the navigation of the Tay, and the cause of frequent shipwreck. It is 2000 feet long, 330 broad, and is partly uncovered during spring-tides. A lighthouse, like that of Eddystone, was built here (1807-11) by Robert Stevenson, engineer to the Commissioners of Northern Lighthouses, which cost over £60,000. It is 115 feet high, and has a revolving white and red light, visible at a distance of 14 miles. Two bells, of over half a ton each, are also employed during foggy weather. The tradition of the bell placed here by the Abbot of Arbroath, or Aberbrothwick, to warn sailors of the hidden danger, is well known through Southey's ballad of *The Inchcape Rock*.

Bells, as a nautical term, denotes a method of indicating the time of a watch on board ship. A long watch lasts four hours, a short watch, two. When the half-hour sandglass is run out, a bell is struck; the number of blows increasing by one each half-hour till the watch is over. Thus the B. reach eight in a long watch, and four in a dog-watch.

Bells have been employed in religious ceremonies from a very early age; and in this connection only they seem to have been in use among the ancient Egyptians and the Israelites (Exod. xxxviii. 3). The Greeks and Romans, however, applied them to domestic and camp purposes; and from Pliny we learn that each of the pinnacles decorating the monument of Porsenna was surmounted by B. They are said to have been introduced into Christian churches by Paulinus, Bishop of Nola in Campania, about the year 400 A.D. It was not, however, till 550 A.D. that they were first known in France; but after this date they were rapidly introduced into all parts of Christendom. About the year 600, Pope Sabinian ordered that B. should be rung every hour; and three centuries later Pope John IX. introduced them into all the churches as a defence against thunder and lightning. Up to the 13th c. the B. in use seem to have been merely small hand-B.; some have been preserved, and whether possessing the antiquity implied in their names or not, are unquestionably very ancient—e.g., St Patrick's Bell, St Ninian's Bell, and the four-sided bell of St Gall, Switzerland. During the 15th c., B. of several tons in weight began to be cast. The bell 'jacqueline' of Paris,

cast in 1400, weighed over 6 tons; the bell at Cologne (1448) weighed 11 tons; the famous bell at Rouen (1501), 16 tons; and at more recent dates we have the Bruges bell (1680), 10½



Bell of Church at Luhnde, Hildesheim, 1278.

tons; the Paris bell (1680), 12½ tons; the Vienna bell (1711), 17½ tons; 'Great Peter' of York Minster (1845), 10½ tons; 'Great Tom' of Lincoln (1834), 5½ tons; 'Big Ben' of Westminster (1856), 15 tons 8½ cwt.; the Olmutz bell, 17½ tons; and the great bell at Peking, 53½ tons. The largest bell in the world, however, is the 'Monarch' of Moscow, being over 21 feet in height and diameter, and having a weight of 193 tons. It was cast in 1736, the value of the metal alone being at the lowest estimate £66,565; fell down and was injured in 1737 during a fire; remained buried to a certain extent till 1837, when it was raised, and it now forms the dome of a chapel.

Bell-metal is an alloy of copper with tin, zinc, or other metal. In England, the proportions in which the metals are mixed vary considerably; but generally the quantity of the copper present is between three and four times that of the tin. Other metals, such as zinc, iron, lead, &c., if present at all, are in much smaller quantity. Hand-bells are often made of brass, German silver, real silver, and gold.

The pitch of the note emitted by a bell depends on its size—the smaller the bell, the higher the pitch. The quality of tone depends much upon the material and the shape of the bell; and it is found that the greater quantity of metal for the same note produces a richer tone. As regards the proportional dimensions of a bell, different English bell-founders have different rules, derived from experience. The Germans, however, give the following numbers: taking the *sound-bow*, the thickest part, where the hammer strikes, as the unit; the diameter at mouth 15, the diameter at top 7½, height 12, and weight of clapper ¼ the weight of the bell. The *sound-bow* is usually made of wrought iron.

From their almost universal connection with religious rites, bells came to be looked upon as possessing a sacred character, and thus arose various superstitious notions regarding their efficacy in warding off diseases, misfortunes, and evil spirits, and in helping to hasten the souls of departing ones to their rest. Hence the custom of tolling the *passing-bell*, which was retained at the Reformation, owing perhaps to its solemn and tender associations; but the people were instructed that it was only intended to warn the living of the lot common to all mortals, and to invite them to pray for the dying. The custom still prevails, but the tolling now takes place usually during the funeral, and more as a mark of respect for the deceased. The baptism of bells, which is still practised in Roman Catholic countries, and which is supposed to have originated in the 10th c., is another example of their sacredness.

The *curfew-bell* is said to have been introduced into England shortly after the Norman conquest, and the name at least is

French. On its ringing at eight o'clock in the evening, all fires and lights were to be extinguished under pain of a severe penalty. The term was retained long after the practice of putting out the lights had been abandoned, and is not even yet forgotten.

'The curfew tolls the knell of parting day.'

In the Netherlands the ringing of chimes is a very common practice. Indeed, in many parts the air is perpetually resonant with their light and silvery melody. The custom has also made great progress in England. Not only the larger towns, but almost every village church is provided with peals of bells; one of the most celebrated is the 'Bow-Bells' of London. Eight bells, forming the diatonic scale, give as many as 40,320 changes or permutations.

The hanging of bells in private dwelling-houses is a modern invention, and was not known in England till the time of Queen Anne. The most approved manner of arranging the wires is to carry them from the communicators up to the top of the house, and then bring them down again to their respective bells. Electric bells have recently been introduced, and are likely to supersede all others. The circuit is completed by pressing a stud; a piece of soft iron is thus magnetised, and raises the hammer, which on falling strikes the bell. For detailed information regarding the history, nature, and applications of bells, the reader may consult *Tintinnologia, or the Art of Ringing; The Bell, its Origin, History, and Uses*, by Alfred Gatty; and E. B. Denison's *Lectures on Church Building, with some Practical Remarks on Bells and Clocks*.

Bells, Blessing of, a ceremony as old as the 7th c., at which, according to the Roman rite, a bishop in cope and mitre, after washing the bell in salt and water, which had been previously blessed, anoints it outside with the oil of the sick, and with chrism inside. After being censed, the bell is considered blessed. According to the Parisian rite, in which the oil of catechumens is used, two persons, who stand as sponsors to the bell, pronounce aloud under whose invocation it is to be named, a circumstance which has led, by mistake, to the ceremony being called the 'baptism of bells.'

Belluno, a city, province of Belluno, N. of Italy, on the right bank of the river Piave; the seat of a bishop, has a fine cathedral, a rich library, numerous churches, two monasteries, a science and art academy, a good gymnasium, and a fair theatre; carries on silk manufactures, and has an active trade in timber. Marshal Victor took hence the title of Duc de Belluno. Pop. (1871) 15,509.

Belomancy (Gr. *belos*, an arrow; *manteia*, divination), a mode of divining by means of arrows with written labels attached to them, practised by various Eastern nations. The arrows, which are either drawn from a bag or discharged from a bow, are supposed to indicate the future from the inscription on the first arrow found in either of these modes. See **AXINOMANCY**, and **DIVINING-ROD**.

Belon, Pierre, an eminent French naturalist, was born at Soulethière (Sarthe) in 1517, travelled in the East (1546-49), and was murdered in 1564 by robbers while botanising in the Bois de Bologne. He enriched the knowledge of his age by a great number of entirely new observations on the natural history of the countries which he visited; and his descriptions of their antiquities, &c., are still interesting. His principal works are, *Observations de plusieurs Singularités et Choses Memorables, trouvées en Grèce, Asie, Indes, Égypte, Arabie et autres Pays estranges, rédigées en trois Livres* (Par. 1553); *Histoire Naturelle des estranges Poissons Marins* (Par. 1551), and *Histoire de la Nature des Oyseaux* (Par. 1553), all of which contain many curious details, and may still be consulted by naturalists with profit.

Belone. See **GARFISH**.

Beloochistan, or **Beluchistan**, the south-eastern part of the plateau of Iran, partly corresponding to the ancient Gedrosia, lies between 24° 50' and 30° 20' N. lat., and between 57° 40' and 69° 18' E. long. It is bounded on the N. by Afghanistan, on the E. by Multan and Scinde, on the S. by the Arabian Sea, and on the W. by Persia. Average length, 600 miles; average breadth, 300 miles; area, from 150,000 to 180,000 sq. miles; pop. between one and two millions. It is for the most part a rocky, dry, and barren highland, bounded in the E. by the Brahui mountains, and falling down to the sandy plains of the S. and W. in a succession of terraces. The only fertile districts are Candawā and Kelat in the N.E. The climate in the stretches of low desert is hot, in the valleys moist and warm, in the high-

lands sharp but healthy. The pastures are poor, hence cattle and horses are few; the ordinary draught animal being the dromedary. Where water is found there are copious tropical harvests; and in the more elevated regions the cereals and fruits of the temperate zone flourish. Copper, iron, lead, and antimony are found, and there are a few manufactures of carpets and tent-covers made of the hair of goats and camels; but the trade is trifling, and mainly in the hands of natives of India. B. is governed by the Khan of Kelat, who, having broken faith with the British in 1839, had his capital taken from him in 1840 and 1841 successively. The sirdars, or chiefs, partly hereditary and partly elected, are under a species of feudal government, and have to furnish a certain quota of troops and attend the court. They are the real governors of B., the authority of the Khan being more nominal than real, especially in the western portions of the country. The inhabitants in the N. and W. are the *Beluchees* proper (a mixture of Persians, Hindu, and Semitic races); in the E., *Brachuis* (a remnant of the original inhabitants, with a peculiar language); in the S.E., the *Lamri*, Sunnite Mohammedans, following a pastoral life. The first are robbers, the second and third peaceful and industrious. Besides these there are Hindus, Tajiks, Armenians, and Jews in the towns. The capital is Kelat (q. v.); the only seaport, Sommeancee, in the S.E., on the Indian frontier.

Belpass'o, a town of Sicily, province of Catania, at the south base of Mount Etna, 8 miles N.W. of the town of Catania. Pop. (1871) 7620. The old town, which was called Mel Passo, was destroyed by an eruption in 1669, and below the present town there is an expanse of lava, offering a striking contrast to the richly cultivated country.

Bel'per (a corruption of Fr. *Beau-repaire*, 'beautiful retreat'), a well-built market-town of Derbyshire, England, situated on the Derwent, 7 miles N. from Derby, and a station on the North-Midland Railway. It has several notable buildings, among which the union workhouse is a splendid specimen of Elizabethan architecture. Cotton is manufactured extensively; also silk, hosiery, nails, and earthenware. The country is rich in coal, iron, and limestone. Pop. (1871) 8527.

Bel'sham, Thomas, a Unitarian divine, born at Bedford in April 1750, educated in Calvinistic principles, and head of the theological academy at Darenty till 1789, when he embraced Unitarian views. After a few years he succeeded Dr Priestley, and in 1805 was appointed successor to Dr Disney in Essex Street Chapel, London—a position he retained till his death in 1829. His theological writings embrace nearly all the doctrines and evidences of Christianity, but his views on the person of Christ are entirely humanitarian.

Belshazz'ar (mod. form *Balthasar*), the last king of Babylon, according to the writer of Daniel and the historian Xenophon, both of whom record substantially the same story, viz., that the city of Babylon was surprised and captured at night by Cyrus, the Persian, who put B. to death. On the other hand, Berosus (according to Josephus) and Herodotus diverge considerably in points from this account. Berosus calls the last king of Babylon Nabonnedus (*Nabu-nit* or *-nahit*, 'whom Nebo prospers'), and states that he was captured by Cyrus in the neighbouring city of Borsippus, and spent the remainder of his life a prisoner in Persia; while Herodotus says that the king of Babylon was called Labynetus, and adds, that though Cyrus took the city by surprise at last, it was only after a long siege. Sir Henry Rawlinson is thought by many to have solved the difficulty presented by these conflicting accounts, for in 1854 he deciphered certain inscriptions found in the ruins of Ur of the Chaldees, from which he ascertained that Nabonnedus had a son, Bel-shar-ezar, who was conjoint-ruler with his father; and he suggested that the son might have perished in the capital, while the father was captured in Borsippus.

Belt (Dan. *Bælt*, a 'belt' or girdle), the name of two straits between the Baltic and the Cattegat. The Great B. separates the Danish islands Zealand and Fiinen, and is about 70 miles long, and from 4 to 20 broad. The Little B. passes between Fiinen and Jutland, and is 10 miles broad. The Sound (q. v.) is preferred to both these channels on account of their dangerous shoals and currents.

Bel'tein, Bel'tan, Bal'tein, Bealtainn, &c., was a great festival among all the Celtic tribes of Europe, which seems to

have been a form of fire-worship, and some of the doings connected with which continued to be practised in Ireland, Scotland, and the Isle of Man down almost to the present generation. That there is, however, any etymological connection between the Celtic *Beal* and the Phœnician or Syrian *Baal* is improbable, though our knowledge is not such as to justify a dogmatic opinion. The great seasons for this nature-worship, one of the chief features of which was the kindling of huge fires, were the summer and winter solstices, and about the spring and autumn equinoxes. On midsummer-day, and especially the 1st of May, which in Irish is called *La Beal-tine*, and in the Highlands of Scotland Beltein-day, bonfires were kindled; the company danced round them and leaped over or through them, keeping up various ceremonies, which pointed to the fact that, in a remote antiquity, human sacrifices had actually been offered to the sun-god.

Of the ways in which the rites were observed in different parts there seems to have been an endless variety. The following is the description of how they were observed in Perthshire as given in Sinclair's *Stat. Acct.*:—"Upon the 1st day of May, which is called *Multein-day*, all the boys in a township or hamlet meet on the moors. They cut a table in the green sod, of a round figure, by casting a trench in the ground of such circumference as to hold the whole company. They kindle a fire, and dress a repast of eggs and milk of the consistence of a custard. They knead a cake of oatmeal, which is toasted at the embers against a stone. After the custard is eaten, they divide the cake into so many portions, as similar as possible to one another in size and shape, as there are persons in the company. They daub one of these portions all over with charcoal until it be perfectly black. They put all the bits of cake into a bonnet. Every one blindfold draws out a portion. . . . Whoever draws the black bit is the *devoted* person who is to be sacrificed to Baal, whose favour they mean to implore in rendering the year productive of the sustenance of man and beast. There is little doubt of these inhuman sacrifices having been once offered in this country as well as in the East, although they now omit the act of sacrificing, and only compel the devoted person to leap three times through the flames, with which the ceremonies of this festival are closed." Rites very closely akin to the above were observed at midsummer; only the Church, with her usual policy, adopted the pagan festival, christened it St John's Day, and represented the fires, torches, &c., to be in commemoration of John the Baptist, who 'was a burning and a shining light' (John v. 35). See Brand's *Popular Antiquities*.

Belu'ga, the 'white whale' (*Beluga leucas*, or *Catodon*) of the northern seas, included, not in the genera of true *Cetacea*, or whales, but in the family of the *Delfini'ae*, or dolphins. The head of the B. is blunt-shaped, and not prolonged to form a beak. No dorsal fin exists, and there are nine teeth in each side of each jaw. These teeth disappear as the animal advances in age. This form rarely occurs in British seas. It is the only defined species of its genus—if we reckon the B. to constitute a genus of itself. The colour is white, and the body averages in length from 12 to 18 feet. These forms are gregarious in habits, and feed chiefly on fishes. The Greenlanders value its flesh as food, and manufacture oil from the blubber, and leather from the skin. Another form, accounted by some naturalists to be of a distinct species (*B. Kingii*), is found in southern seas. Two young ones are produced at a birth. A B. was captured in the Firth of Forth in 1815, and in the river Medway in 1846.

The name B. is also applied to a species of Sturgeon (q. v.) (*Acipenser* or *Sturio huso*) found in the Caspian and Black Seas, and which attains a length of 12 or 14 feet, and a weight of 1200 or even 3000 lbs.

Bel'us. See BAAL.

Belvede're (It. 'fine prospect'), the name originally given by the Italians to an erection on the top of a house for the purpose of enjoying a view of the surrounding country. It is also applied to a part of the Vatican which contains the famous statue of Apollo. The corresponding French term is *Bellevue*, which is given to any place of refreshment possessing summer-gardens.

Belvedere, or **Summer Cypress** (*Kochia scoparia*), an annual plant, a native of the middle and S. of Europe, and of temperate Asia, belonging to the natural order *Chenopodiaceae*, long cultivated in our gardens as an ornamental annual.

Belvisia, or *Napoleonea*. See **BELVISIACEÆ**.

Belvisiaceæ, a natural order of plants closely allied to the mangrove order, or *Rhinophoraceæ* (q. v.), or to *Barringtoniaceæ* (q. v.), natives of tropical Africa. In addition to *Belvisia* (or *Napoleonea*), there is only the genus *Asteranthos* in the order, which comprises four species. The pulp of the fruits is edible, and the pericarp contains much tannin.

Belzoni, Giovanni Battista, an Italian traveller, was born at Padua, November 5, 1778, and educated at Rome for the priesthood, which he forsook on the capture of Rome by the French. After travelling through Holland, England, and Spain, for nearly fifteen years as an athletic performer, during which time he pursued in his leisure hours mechanical studies, he went to Egypt in 1815, where he executed an hydraulic machine for Mehemet Ali. He then directed his attention to exploration. In 1817 he opened the tomb of Psammetichus, and removed from it the splendid sarcophagus now in the British Museum. After opening the pyramid of Cephren, his greatest achievement, he spent some time in searching for the temple of Jupiter Ammon, and in the course of his investigations discovered the emerald-mines of Zubara and the ruins of Berenice. In 1821, he published at London his *Narrative of the Operations and Recent Discoveries, &c., in Egypt and Nubia*. B. died at Gato, December 3, 1823, on a journey to Timbuctu.

Bem, Joseph, a Hungarian patriot and soldier, was born at Tarnov, in Galicia, in 1795, and for many years made a livelihood by teaching in France. The Hungarian revolution of 1848 brought him into prominence, and his courage, generalship, and power of organising rapid movements becoming known, he was appointed commander of the Hungarian army in Transylvania. In this capacity he inflicted several severe defeats on the Austrians, and ultimately expelled both them and the Prussians from Transylvania. In the final stages of the gallant but hopeless war, B. showed great bravery, and when at last he found himself unable to defend Transylvania, he escaped into Turkey. There he became a Mohammedan, and entering the army, rose to the position of pasha. He died of fever, 10th December 1850, at Aleppo, whither he had gone to suppress a rising of Arabs against the Christian population. See Czecz, *B.'s Feldzug in Siebenbürgen* (1850).

Bembo, Pietro, an Italian scholar and ecclesiastic, born in Venice, May 20, 1470; studied Greek under Lascaris at Messina, and philosophy at Ferrara. He then returned to Venice, and was received into the famous society of scholars that met at the house of the publisher Manutius, for whom he edited Petrarch's Italian poetry (1501), and the *Terze Rime* of Dante (1502). From 1506 to 1512 he resided at the court of Urbino; then repairing to Rome, he became secretary to Leo X. till the death of that Pope. Although a priest, he was something of a pagan in his manner of life, like not a few of the Renaissance scholars, and had a mistress who bore him three children. In 1539 Paul III. elevated him to the cardinalate, and gave him the bishoprics of Gubbio and Bergamo. He died January 18, 1547. His literary taste was very fastidious, and he subjected his writings to numerous revisions, but, like their author, they are not free from the licentiousness of the age. Of his *Rerum Veneticarum, Libri XII.* (Venice, 1551), an Italian version was published the following year. A complete edition of his works in prose and verse, which embrace dialogues, letters, sonnets, songs, &c., was published at Venice in 4 vols. 1729.

Bembridge Beds, a series of strata about 115 feet in thickness, belonging to the *Upper Eocene* formations of the Cainozoic period, and chiefly developed in the Isle of Wight. They include (beginning with the lowest beds)—Firstly, the *B. Limestone*, a pale yellow limestone, interstratified with clay or marl, and containing siliceous or cherty bands in some cases. The thickness of the first layer is from 20 to 25 feet. Secondly, the *Oyster bed*, consisting of a few feet in thickness of greenish sands containing the remains of oysters (*Ostrea Vectensis*), and of other marine molluscs. Thirdly, the *Non-fossiliferous mottilal clays*, alternating with fossil-bearing clays and marls, containing the lamellibranchiate molluscs *Cyrena pulchra*. Fourthly, *Marls and laminated grey clays*, containing *Melania turritissima*. Above this last series lie the *Blackband* and *Marls*, which form the lowest of the *Hampstead* series of beds, this series overlying the *B. strata*. In the *B. B.* the fossil remains of the extinct

mammalia *Anoplotherium* (q. v.) and *Palaotherium* (q. v.) are found, along with other less familiar fossil forms. The *B. B.* themselves rest upon the *St Helen's Sands*, or uppermost strata of the Osborne series, also developed in the Isle of Wight, and belonging to the *Middle Eocene* formations. All the fossils of these strata are of estuarine or of fluviomarine kind, and indicate the formation of these rocks from brackish or estuarine waters.

Ben, or **Beann**, the Gaelic word for a mountain-summit, or head. Another form is *Caann*. It enters into the composition of numerous names in the Highlands of Scotland—e.g., Ben Nevis, Ben Macduh, Ben Lomond, &c. The corresponding Cymric form is *Pen*, seen in *Pen-nine*, *Pen-rith*, *Pen-rhyn*, *Penmaen-mawr*, &c. In Ireland, according to Dr Joyce (*Irish Names and Places*, 1st ser., pp. 349, 350), B. is not applied to high hills, but to moderate heights; and its different application in Scotland suggests the possibility of its being a Pictish as well as a Scottish, i.e., Irish word, especially since Dr Skene (*The Four Ancient Books of Wales*, vol. i. ch. viii. and ix.) has shown the likelihood of the Pictish dialect being more allied to Gaelic than to Cymric.

Ben (Heb. 'son,' in composition 'son of'), forms the first syllable of many Old Testament proper names, as Benjamin (Gen. xxxv. 18). The plural, Beni, is found in several modern names, as Beni-Hassan. Among the Arabs, Beni (the sons of some one) is the designation of a tribe, just as the clans in the Highlands of Scotland are Mac-Donalds, Mac-Duffs, &c.

Ben, Oil of, a fluid fixed oil obtained from the seeds of the horse-radish tree (*Moringa pterygosperma*), a native of India and Arabia, the seeds of which are called *Ben nuts*. It is sometimes used by perfumers, painters, and watchmakers.

Benares, the chief city of a district and division of the same name, N.W. Province, British India, on the left bank of the Ganges, 421 miles N.W. of Calcutta, and 74 S.E. of Allahabad. It is the chief seat of Hinduism, the Rome of India, extends about 3 miles along the sacred river, and contains 1000 Hindu temples and over 30 mosques, including the splendid one of Aurangzebe. Broad flights of steps or *ghats* descend to the river, forming a magnificent terrace, which is used as a sort of market-place. B. is visited by vast numbers of pilgrims, amounting on special occasions, it is said, to 100,000. The streets are everywhere narrow, and the houses generally of a mean description. Sacred bulls and apes move at large, and are tended by the priests of Siva. B. (its Sanskrit name is *Varanasi*) is a city of great antiquity; according to Hindu tradition, indeed, it is coeval with the world. In Sanskrit poetry, where it figures as the seat of a half-mythical race of rulers, it is called *Kasi*—i.e., the splendid—and is celebrated as the oldest seat of Brahmanical learning. Long subject to the Rajput princes of Kanoj, it first fell under Mussulman domination in 1193, when it was conquered by the Ghuride Rut-bed-din. In 1529 it was seized by the first Great Mogul, Baber, and on the breaking up of the Mogul empire became the possession of the Nawab of Oude, whose grandson ceded it to the English in 1775. The Sanskrit College of B. was founded in 1792, and now embraces a modern department for literature, history, mathematics, political economy, and the English and Persian languages. B. is also a rich commercial centre, and is connected by railway with Calcutta, Bombay, and the Punjab. It has important manufactures of shawls, indigo, sugar, and cloth of gold and silver, and is the principal jewel-market in the whole of Asia. Pop. (1872) 175,188, including the British cantonments of Secrole (q. v.). The district of B. is watered by the Ganges, the Karamnasa, the Gumti, and minor rivers, and yields abundance of rice, opium, sugar, and indigo. Area, 996 sq. miles; pop. (1872) 794,039, mostly Hindus. B. district has a permanent settlement of the land-tax like Lower Bengal.

Benavente, a town of Spain, province of Zamora, 34 miles N. of the town of Zamora. It is surrounded by a mud wall, and commanded by a half-ruined castle, formerly the seat of the Counts of B. It was here that Moore's retreat may be said to have commenced; and the castle was gutted by Soult on his retreat from Oporto. Pop. about 2500.

Benbecula, a small island of the Hebrides, lying between N. and S. Uist, and included in the latter parish, Inverness-shire. It is low, boggy, and sandy, measuring 8 or 9 miles each way. Pop. (1871) 1563, engaged chiefly in fishing.

Benbow, John, an English rear-admiral, born in Shropshire in 1650. After distinguishing himself in the merchant-service, James II. gave him a commission, and William III. appointed him to an important command, and in a few years advanced him to the dignity of rear-admiral. A gallant exploit, rendered memorable by the bravery of B. and by the cowardice of his officers, an unusual occurrence in the British navy, was his last. On the 19th of August 1702, after a chase of several days, he came up with a French force under Admiral Du Casse. The brunt of the engagement, which lasted four days, fell on B.'s ship, his officers refusing to obey his signals. On the morning of the 24th his right leg was shattered by a chain-shot, but he continued the engagement till night. He then sailed to Jamaica, where he died on the 4th of November.

Bench signifies ordinarily the elevated part of a court-room in which judges sit to administer the law. The term is often applied to the judges themselves; thus we say, 'it was the opinion of the *B.*' So we speak of the *B.* and the bar.

Bench, King's or Queen's. See COURTS OF LAW; COURT OF JUDICATURE, SUPREME ACTS.

Bench'ers, the ruling bodies of the Inns of Court (q. v.), Lincoln's, Inner and Middle Temple, and Gray's Inns. They are commonly Queen's Counsel or distinguished barristers.

Bench-mark, a mark of any kind (in the Ordnance Survey an arrow) made upon a stone, a wall, or in any other suitable situation, to indicate the position of a station in a survey.

Bench Warrant is a warrant issued for prompt execution by justices sitting on the bench or in session.

Bencoolen (Dutch *Benckolen*, a corruption of the native *Bangkulu*), is the name of a Dutch town on the S.W. coast of Sumatra, at the mouth of a river of the same name, built on piles of bamboo in a swampy and unhealthy district, though the town has a fine appearance from the sea, on account of an overhanging mountain called the 'Sugar-Loaf.' It carries on a trade with the ports on the Bay of Bengal in the produce of the district—pepper, rice, coffee, maize, sugar-cane, &c. B. was founded in 1686 by the English, but ceded to the Dutch in 1824. Pop. about 12,000. It is the capital of a residency, with an area of 9567 sq. miles, and a pop. of 126,000.

Bend, in heraldry, one of the Honourable Ordinaries (q. v.), occupying, if plain, a fifth part of the shield in width; a third, if charged. It is formed by two parallel lines passing diagonally athwart the shield—from the dexter chief to the sinister base for the *B. dexter*, or simply the *B.*; from the sinister chief to the dexter base for the *B. sinister*. The diminutives of the *B.* are the *bendlet*, one-half of its breadth; and the *cotise*, a fourth. A cotise is sometimes borne couped at its extremities, and then it is called a *ribbon* or *riband*. The fact that a charge is placed diagonally on the shield is indicated by the words *in B.*, *per B.*, *bendy*, &c.

Bend, a nautical term denoting one of the many kinds of knot by which a rope is fastened to another rope, an anchor, cable, sail, &c.

Ben'demann, Eduard, one of the best known of the Düsseldorf school of painters, born at Berlin, 3d December 1811, studied at Düsseldorf under Schadow, exhibited his 'Ruth and Boaz,' a picture remarkable for grace and natural treatment of details, in 1830; his 'Captive Jews,' a work still more admired, in 1832; his 'Girls at a Fountain,' and 'Jeremiah at the Ruins of Jerusalem'—the latter won the gold medal of the Berlin Academy—respectively in 1833 and 1837. Appointed Professor of the Academy of Arts at Dresden in 1838, he was commissioned to decorate the royal palace there with frescoes, and these works are the finest efforts of his genius, which is exquisitely poetical. B. married the daughter of Schadow in 1838. Recently he has been much engaged in painting portraits, that of his wife being a masterpiece. He was appointed director of the Academy, Düsseldorf, in 1860.

Ben'der (Turk. a 'market' or 'harbour'; the Russian form is *Bendery*), formerly *Zeckin*, a fortified town in Bessarabia, Russia, on the right bank of the Dniester, 48 miles from its mouth. The origin of the town is unknown, but as early as the

12th c. the Genoese had an establishment here. The Russians stormed it in 1770; it was restored to the Turks in 1774; it was again captured by the Russians in 1809; and after being once more restored to the Turks, it was again taken in 1811 by the Russians, in whose possession it now remains. There is a mixed pop. of 22,448, employed in paper-mills, tanneries, iron-smithies, and a saltpetre-work. After his defeat at Poltava, Charles XII. of Sweden resided in the neighbourhood of B. from 1709 to 1712.

Ben'digo, a county and leading goldfield of Victoria, situated between 143° 50' and 144° 40' E. long., and 36° 10' and 46° 55' S. lat. Its area is about 1400 sq. miles. See SANDHURST.

Be'ne Vagi'enne (anc. *Augusta Bagiennorum*), an Italian town 18 miles N.E. of Coni, in the province of Cuneo, Piedmont. Many interesting remains of antiquity have been found in its neighbourhood. Pop. (1871) 6131.

Ben'edek, Ludwig von, an Austrian commander, was born at Oedenburg, in Hungary, in 1804. After a training at the Military Academy of Neustädt, he entered the Austrian army in 1822 as a cornet, and in 1843 had attained the rank of colonel. He showed considerable military ability in quelling an insurrection in Galicia; and in the Italian war of 1848-49 still more distinguished himself, contributing considerably to the victory of Novara. In the war of 1859, B. was almost the only Austrian commander that showed generalship, his division being the last to leave the field at Solferino. After acting for a time as governor of Hungary, he was appointed, with the title of marshal, to the chief command of the Austrian armies in the war with Prussia in 1866; but was utterly beaten at Sadowa, July 3, and was superseded by the Archduke Albrecht.

Benedetti, Vincenzo, a French diplomatist, was born at Bastia, Corsica, April 29, 1817. He was first chancellor of the French consulate in Alexandria; in 1848 consul at Palermo; on the establishment of the empire, secretary to the French embassy at Constantinople; and, after the Crimean war, director in the office of the Minister of Foreign Affairs. In 1861 he went as ambassador to Turin, and in 1866 arranged the armistice of Nikolsburg between the Austrians and Prussians. From this date he remained at Berlin as extraordinary ambassador till the outbreak of the Franco-Prussian war of 1870. During these years he carried on frequent conversations (if not negotiations) with Count von Bismarck, concerning the rectification of the frontiers of their respective countries, in which the subtle Italian was completely outwitted by the crafty Teuton, who got him to put upon paper proposals of a highly unscrupulous character. At Ems, in July 1870, B. demanded of the Prussian king, in the name of his master, not only the withdrawal of Prince von Hohenzollern from his candidature for the Spanish throne, but also a promise that this German candidature would never again be supported. King Wilhelm held it beneath his dignity to bind himself for the future. His refusal led to a declaration of war by the Emperor in less than a week, and before two months had passed France was utterly crushed, the Napoleonic dynasty overthrown, and a republic proclaimed. B. has written a vindication of his Prussian diplomacy, *Ma Mission en Prusse* (1871), which has not added to his reputation either for ability or honesty.

Benedi'cite, the song of the Three Children in the fiery furnace, a Christian hymn as ancient as the 4th c. It is sung in the morning service of the Church of England when the *Te Deum* is not used.

Ben'edict, one of the great saints of the early Church, and the founder of the first religious order of Western Christendom, wa. born at Nursia, in Central Italy, in 480. At the age of fourteen he was sent to Rome to school, but becoming disgusted with the dissipation of the place, and the sterile instruction of the ancient schools of literature and jurisprudence, he ran away and concealed himself in a cavern at Sublacum (Subiaco), 40 miles from Rome. Here he remained in concealment for three years, but his hiding-place was at last discovered, and a numerous auditory soon came to listen to his preaching, and his cavern for some time was a place of pilgrimage. Some of those who came to hear him placed themselves under his guidance, and from 520 to 527, there were formed about him 12 religious families, each composed of 12 monks under a head or abbot, who lived according to rules which they drew up for

themselves. His popularity, however, excited envy, and even led to plots against his life. In 529 he left Sublacum, and established himself at Monte Cassino, about 50 miles from Naples. Here he converted a body of pagan mountaineers, and turned their temple into a monastery. The rule he prescribed for his new society of monks shows that his aim was to have its members spend their life in prayers, reading, manual labour, and the instruction of youth. The fame of his piety soon spread through the peninsula, and though the land was then in the throes of the great struggle between the Ostrogoths and the generals of Justinian, Totila, King of the Ostrogoths, found time to visit the illustrious cenobite. The interview between the Arian monarch and the Trinitarian monk was equally honourable to both. B. died in 543. What distinguished the cenobitic life of B. and his followers was the beautiful union of labour, religion, and learning. They worked in the field and the garden, prayed in their cells, taught the young the rudiments of sacred and profane knowledge, and transcribed works of piety and the masterpieces of the ancient literature. Before B.'s time the recluses of the West had wasted their lives in barren inactivity; but this rational reformer drew up a *regula vite* ('Rule of Life') which even yet excites in many respects the admiration of Christendom, and can still be praised, in the language of Gregory the Great, as *discretionis precipua, sermone luculenta*. B., who did for the West what Antony (q. v.) and Pachomius (q. v.) had done in an earlier century for Egypt, and Basil (q. v.) for the East, was superior in genius, wisdom, and humanity to any of the three. We may be thankful that his earlier followers spread themselves with the spread of the Latin Church; for by their labours and their examples they everywhere gave the victorious barbarians lessons of order, economy, instruction, and refinement which powerfully aided to restore the civilisation of Europe. See BENEDICTINES.

Benedict, is also the name of fourteen popes, of whom the first seven flourished between the 6th and 10th centuries, and are historically insignificant. Of the remainder, the most notable are: 1. **B. VII.**, who was born at Tusculum, of the family of Conti, and elected pope in 1012. After being driven from Rome by the antipope, Gregory, he was restored by the emperor, Heinrich II., in 1014, who confirmed the Church in all the rights and privileges originally conferred by Charlemagne. With the aid of the Pisans, B. took Sardinia from the Saracens, and induced Heinrich to march with an army to Italy to oppose the Greeks; he died in 1024. Four letters written by him were published at Paris in 1667.—2. **B. IX.**, a nephew of the preceding, was elected in 1033, at the age of ten, and was maintained on the throne by the power of the Emperor Konrad for nearly twelve years, but at last expelled for licentiousness in 1044. Three months after, he re-entered Rome, but proving still obnoxious to the citizens, he sold the papal chair to the antipope, John XX., and actually crowned him with his own hands. He again seized upon the pontifical power, when there were three equally unworthy popes alive. From these John Gratianus purchased the tiara, and became pope under the name of Gregory VI. At the Synod of Sutri, Heinrich III. deposed Gregory for simony, and Clement II. was elected. After his death in 1047, B. IX. was again elected, but was finally displaced in 1049, when he retired to a convent, where he is said to have lived an exemplary life till his death, the date of which is not known.—3. **B. XII.**, a native of Saverdun, in the county of Foix, was elected pope at Avignon, 13th December 1334, and held the office for eight years. Though living away from the capital of Christendom, B. was a strenuous reformer of ecclesiastical abuses. He compelled the clergy who had the cure of souls to reside in their parishes, prosecuted simoniacs, reformed religious orders, sought out and encouraged good priests, and set his face against nepotism. He loved the society of scholars, and his theological works attest his knowledge and his eloquence. B. died 25th April 1342.—4. **B. XIII.** belonged to the Orsini family. He was elected in 1724, and was a man of great simplicity of life and of high morality. He declared the bull *Unigenitus* a rule of faith, but better deserves remembrance for his apostolic virtues. His heart was in hospitals and prisons, among the poor, the wretched, and the lowly. His noble ambition was that Rome should be *de facto* as well as *de jure* the capital of the Christian world. A large number of names was added to the calendar of saints during his pontificate. The political sagacity of B. was not equal to his virtues, and he allowed his confidence to be abused by Cardinal Coscia.—5. **B.**

XIV., the son of Marcello Lambertini, a Roman senator of distinguished family, was born at Bologna, 31st March 1675, studied first theology, then canon and civil law. B. was made bishop of Ancona (1697), cardinal (1728), archbishop of Bologna (1731), and pope (1740). He took for his first minister Cardinal Valenti, and otherwise displayed a remarkable knowledge of men. Strangers visiting Rome were treated with the sincerest kindness; and Horace Walpole was so impressed with this, that he wrote a splendid eulogium of him. B. died 3d May 1758. The best edition of his works are those published at Rome, in 12 vols. 1747-51; and at Venice, in 16 vols. in 1777. See Fabroni's *Vita de Benedetto XIV.*, and *Vie du Pape Benoît XIV.* (Par. 1775, and again 1783).

Benedict Biscop, an English saint and churchman, who in the 7th c. worked with quiet energy for the ecclesiastical supremacy of Rome as against Iona. Born in 628 of noble family (according to Bede, who was his pupil, and has written his life), he was till the age of twenty-five a courtier of Oswin, king of Southern Northumbria. Then, in company with Wilfrith of York, he went to Rome, where he remained as a student for ten years. In 665 he became a monk at Lerins in Provence, and in 668 returned to England with Theodore of Tarsus, Archbishop-elect of Canterbury, to whom in a supreme decree the Church in England owed its advance from a missionary agency to an organisation for religious and literary culture. B. was chosen abbot of the monastery of St Augustine in Canterbury, and his life is simply one strenuous effort to introduce into England the graceful pomps and intellectual treasures of Roman Christendom. In all, he paid five visits to Italy, bringing back on each occasion a multitude of books, pictures, relics, palls, &c. He built the noble monastery at the mouth of the Wear, in his native Northumbria, and ruled it for years along with Ceolfrith and other coadjutors. Here Bede received his early education, and amassed those stores of learning which have made his name 'venerable' to all succeeding ages. We may also ascribe to B. the introduction of the Roman choral service into England, for it was he that brought over Abbot John, archchanter of St Peter's, Rome, to teach first in the monastery at Wearmouth, and afterwards in other parts of the island, 'the order and manner of singing and reading aloud, and committing to writing all that was requisite throughout the whole course of the year for the celebration of festivals' (*Hist. Eccl. Gent. Angl.*, lib. iv. c. xviii.) B. died 12th January 690. See Bede's *History of the Abbots of Wearmouth*.

Benedictines are monks who follow the rule (*regula vite*) of St Benedict, although that rule, as drawn up for his monastery at Monte Cassino in 529, has been greatly departed from, notwithstanding that he was the first to make monastic vows irrevocable, and a rule permanently binding. The order spread far and wide, probably owing to the rule being better adapted to Europeans than the Eastern asceticism which had previously prevailed. Besides their social worship and private meditations, seven hours of each day were devoted to labour, such as agriculture, gardening, and various mechanical trades. Hence, wherever they settled, they were of great advantage in cultivating and civilising the country. Further, their rule required them to read a portion of each day, and to provide for this, part of their labour was transcribing MSS.; by which means many of the most valuable literary remains of antiquity, both religious and secular, were preserved. Their learning, reputation for sanctity, and especially their education of the sons of many noble and even royal houses who were entrusted to their care, all brought wealth and power to the order. But after wealth came luxury, idleness, and vice; they became involved in civil and political affairs and the cabals of courts, especially in trying to advance the power of the popes. Among the branches of the order were the congregation of Clugny, founded about 927; of the Cistercians, 1098; of Monte Cassino, 1408; St Vannes, 1600; and St Maur, 1629. In 1354 the B. had 37,000(?) monasteries; in the 15th c., 15,107, of which 5000 only were left after the Reformation; at the present time there are about 800. The B. were also called the 'Black Monks,' from their dress, a black gown and hood. See *Annales Ordinis Sancti Benedicti*; the *Acta Sanctorum* (q. v.); Reynier's *Apostolatus Benedictinorum in Anglia* (Douai, 1626); the *Bullarium Cassinense* (Ven. 1650); Tassin's *Histoire de la Congrégation de St Maur* (Par. 1770); *Cronica de la Orden de San Benito* (Salamanca, 1609-15, 7 vols.); *Regula Sancti Benedicti et Con-*

institutiones Congregationis Sancti Mauri (Par. 1770); Montalembert's *Mémoires de l'Occident depuis Saint Benoît jusqu'à Saint Bernard* (Par. 1860-67); and the Church Histories of Mosheim and Neander.

Benedict, Sir Julius, a musical composer, was born at Stuttgart, 24th December 1804, and studied music under Hummel at Weimar, and Weber at Dresden. He has been resident in London since 1836, where he is a popular pianoforte teacher and conductor. In 1871 he received the honour of knighthood. B.'s most important compositions are his oratorio of *St Peter*, written for the Birmingham Musical Festival (1870), the opera of the *Lily of Killarney* (1862), and a recently produced symphony in G minor. As conductor of the 'Monday Popular Concerts,' he has done much to elevate musical taste, and bring the finest chamber-music within reach of the people.

Benediction (Lat. *benedicere*, to speak well of), an invocation of the blessing of God on persons or things. The ceremony dates from the earliest times, and the blessing of their children by the patriarchs before their death, and of the people by the high-priest, are recorded respectively in Genesis and Numbers. Before parting with his disciples at Bethany, Christ blessed them with uplifted hands; in the Roman Catholic Church the bishop and the priest both bless the people, though each uses a different formula; and the blessing of the city and the world (*urbi et orbi*) by the pope on Easter Sunday is a most impressive spectacle. The B. is conferred by the bishop at the coronation of kings and queens, the confirmation of the dignitaries of the Church, and the consecration of churches, altars, &c., while the priest may pronounce it on church bells, priestly garments, churchyards, &c. The grace before meat is a continuation of the old B. of the table and the viands. There are two benedictions in the English liturgy; the service of the Scotch Church has only one.

Benedictus, a portion of the musical service at mass in the Roman Catholic Church. The music, with a translation of the words into English, has been introduced into the morning service of the Anglican Church.

Benefice. In the Church of England, vicarages, rectories, and other parochial charges are so called. Ecclesiastical dignities and offices—as canonries, deaneries, &c.—are called *cathedral preferments*.

Qualifications for holding a B. in the Church of England are—holy orders, presentation by patron, institution by bishop, induction, which proceeds on a mandate by the bishop to the archdeacon. The Act 23 and 24 Vict., cap. 142, makes improved provision for the union of benefices. Contiguous benefices may be united without regard to aggregate population or yearly value. Act 26 and 27 Vict., cap. 120, makes saleable the advowson of certain benefices in the gift of the Lord Chancellor, the proceeds to be applied to improve other small livings in his gift. See PLURALITIES.

Beneficiary, in England, means the holder of a benefice. In Scotch law, B. means one having an interest in real or personal estate under a trust or will. The analogous term in the law of England is *Cestui que trust* (q. v.). See TRUST, TRUSTEE.

Beneficium Inventarii, in Scotch law, was a privilege of an heir of heritage (real estate), who was doubtful if his inheritance was worth his predecessor's debts, for which it was liable, and for which he, the heir, became personally liable unless he protected himself by taking the B. I. Under it, he was allowed a year to frame and lodge an inventory of 'all lands, houses, and annual rents,' &c., to the value of which his liability became limited. But the privilege is now of little value, as a decree of special and general service now makes the heir liable only to the value of the heritage which comes to him.

Benefit or Friendly Societies. Societies are so called which are formed for the common good of the members, by each paying a stated sum periodically, while able to work, and receiving a periodical sum during sickness; and, in the event of a member's death, his funeral expenses are usually paid by the society, and sometimes a pension, after a certain age, is provided. There are, however, B. S. having great variety of scope. Some are established to facilitate the purchase of houses. As these are institutions of special and growing importance, we treat of them separately. See BUILDING SOCIETIES.

Here we shall only treat of those whose scope is as indicated above, or similar to that. The principle of which a B. S. tries to avail itself is that of the ascertainable certainty of the operation of the law of probability, when that operation can be noted over a sufficiently extensive field. See PROBABILITY, LAWS OF. Thus, as applicable to their purpose, while continuance of health and age at death are to an individual most uncertain, these events will occur we know in a multitude with nearly perfect regularity. But, unluckily, in the earlier days of B. S., there was no sufficient basis of observation and calculation on which to conduct their operations. To obtain sufficient statistics, and to work these statistics to bring out sound results with respect to sickness in different classes and at different ages, was a work of difficulty, requiring much time and science for its successful performance. The earlier societies, therefore, generally miscarried. One of their chief errors was not sufficiently taking into account—or wholly leaving out of account—the fact that liability to sickness, after a certain age, increases with increasing years. Another important element, with respect to which, until recent times, there were no trustworthy data, was the influence of occupation on health, and the effect of exposure to weather, as combined with hard and light labour. See VITAL STATISTICS. These important points have been ably investigated into and treated of by Mr A. G. Finlaison, in his *Report on F. S.*, with tables and returns, printed by order of the House of Commons, 16th August 1853; by Mr Neison, in his work on *Vital Statistics* (Lond. 1853), and by Mr H. Ratcliffe, in his *Observation of Rate of Mortality and Sickness existing among F. S.*, Manchester 1850.

By direction of Government, tables have been prepared by Mr John Field Pratt, late Registrar of F. S. in England, and by Dr Farr, actuary of the Registrar-General of England. So far, therefore, we may now consider that B. S. have trustworthy ground on which to conduct their business. The Legislature also has strenuously endeavoured (see next article) to promote the well-being of these societies; yet it is to be feared, so great are the difficulties involved in their successful constitution, that there are still great numbers in England either already insolvent or on the way to insolvency. The inefficiency of state control to prevent this unfortunate condition is pointed out by Mr Pratt in his report, where he says, that though the legality of the rules of the B. S. has been duly proved, 'it does not follow as a necessary consequence that the constitution of the society is based on good principles, or that the rates of payment are sufficient in amount to guarantee the promised benefits and allowances.'

Benefit or Friendly Societies, Laws regarding. Acts of Parliament respecting these societies were consolidated and amended by 18 and 19 Vict., c. 63. By that Act all previous statutes are repealed, with some reservation respecting societies instituted under any of them. Three registrars are appointed, one for England and one for Ireland (both to be barristers), and one (to be an advocate) for Scotland, all to be of not less than seven years' standing. The objects for which such societies may be established are set forth. These are mainly to ensure a limited sum to be paid to a member on the birth of a child, or to the family of a member on his death, and for the relief of those dependent on a member during his incapacity for work.

The funds of the society are to be invested according to the decision of the majority, in the savings banks, the public funds, with the Commissioners of the National Debt, or in such other securities as the majority shall direct, but not in land nor in houses (except for the purpose of holding their meetings), nor in personal securities.

Members are not allowed to belong to more than one such society. No member is to contract for an annuity exceeding £30, or for a sum payable on death or on any other contingency exceeding £200. No money is to be paid on an insurance on the death of a child under ten years of age for funeral expenses without a certificate, signed by a qualified medical practitioner, stating the probable cause of death. Provision is made against a trustee or officer paying any sum for funeral expenses above £6 for a child under five years, or £10 for a child between five and ten years. Where the rules of any B. S. direct disputes to be referred to justices, any justice in the neighbourhood of the society's place of business may act. In the event of a dissolution of a society, division of the funds may be referred to the registrar, whose award is final.

In England a secretary of state, and in Scotland the Lord Advocate, may authorise the formation of a B. S. under the Act for any suitable purpose, with the restriction above stated as to the amount of annuity or insurance to be contracted for.

Benefit of Clergy. This term is of very frequent occurrence in old expositions of criminal laws. The *Privilegium Clericale*, as it is called, shows the extraordinary influence and power of the clergy during the dark ages. Places consecrated to religious solemnities were held as sanctuaries, in which no criminal could be arrested. The clergy were not amenable to the criminal jurisdiction of a secular judge. The first of these immunities was abolished by 21 James I., c. 22. The second came down to our own time, not having been abolished till the passing of the Act 7 and 8 George IV., c. 28. Originally B. of C. was only accorded to those in holy orders, but subsequently the privilege was extended to every one who could read. When any one convicted of a felony, therefore, was about to receive sentence, a book was put into his hand, and if he could read he was branded on the hand and discharged; if he could not read, he was punished according to his crime. In the reign of Anne the reading test was abolished; and by the Act of George IV., above cited, B. of C. was done away with. Now every British subject, peer or commoner, layman or clergyman, is amenable to the same criminal procedure. The privilege of B. of C. never existed in the law of Scotland. An interesting historical account of its origin will be found in Blackstone, b. iv. c. 28.

Benéke, Friedrich Eduard, a German philosopher, born at Berlin, 17th February 1798. After studying at Halle and Berlin, he commenced to lecture on philosophy in the University of Berlin, but had to discontinue from the opposition of his views to those of Hegel. After Hegel's death in 1832, B. was appointed extraordinary professor. In March 1854, he committed suicide in the canal at Charlottenburg, but his body was not found till June 1856. His philosophy, founded on consciousness, and his method, the Deductive or Baconian, are allied to the British school of thought. B.'s *Lehrbuch der Psychologie als Naturwissenschaft* (2 vols. 1825-27), *System der Logik* (2 vols. 1842), *Erziehungs- und Unterrichtslehre* (1842), and *Pragmatische Psychologie* (2 vols. 1850), are among his most important works.

Benevento, the capital of a province of the same name, S. Italy, near the confluence of the Calore and Sabato, 32 miles N.E. of Naples, was one of the chief cities of Samnium, but came into the possession of the Romans about 274 B.C., and was an important city under the empire. In 571 A.D. the Lombards conquered B., and made it capital of a duchy embracing their entire southern possessions. The Normans took it in 1053 and bestowed it on the Pope, under whose direct dominion it came on the death of the feudatory prince in 1077. In 1806 it was taken by the French, and became a principality under Talleyrand, created Prince of B. by Napoleon; but in 1815 it was restored to the Pope, whose it remained till 1866, when it was annexed to the kingdom of Italy. It gives name to an archbishopric (founded in 969), and has 8 churches and 19 cloisters. It carries on a considerable trade in corn, and has some manufactures of gold and silver ware, leather, and parchment. But it is chiefly memorable for its relics of antiquity. Not only does it occupy the site, but in one sense it may even be said to be the ancient B. Almost every house is built out of the remains of Roman altars, monuments, columns, beams, &c. Perhaps the most splendid relic of the past is the Arch of Trajan (114 A.D.), which still serves as a gateway for the city, and bears the name of the *Porta aurea*. The inscription is still legible, and there are representations in bas-relief of scenes in the life of the emperor, and of the classic divinities. Pop. (1871) 20,133.

Benevolence. A kind of forced loan exacted by some of the kings of England from the people, was so called. The levying of a B. in the reign of Charles I. occasioned much excitement in the nation, and the Petition of Right (see RIGHT, PETITION OF) demanded that no tax shall be leviable in England without consent of Parliament. This was already a right of the nation under Magna Charta. It was further established by act of the Legislature in the reign of William and Mary, and the crown has not since called the right in question. To levy a tax is now exclu-

sively the privilege of the House of Commons. See under PARLIAMENT, *Supplies*.

Benfey, Theodor, one of the ablest philologists of Germany, was born at Nörten, 28th January 1809. He attended the gymnasium of Göttingen from 1816 to 1824, studied classical philology first at the university of the same city under the direction of Ottfried Müller and Disson, and afterwards at Munich under Ast and Thiersch. From 1830 to 1834 he devoted himself at Frankfurt and Heidelberg to Sanskrit. In the latter of these years he was appointed a professor at Göttingen, where he has since remained. Excellent as are his *Ueber die Monatsnamen einiger alten Völker* (Berl. 1836), *Griechisches Wurzellexikon* (2 vols. Berl. 1839-42), *Ueber das Verhältniss der Egypt. Sprache zum Semit. Sprachstamm* (Leips. 1844), what has given him celebrity in the learned circles of Europe is his profound series of works on the Sanskrit language and literature: e.g., his edition of the Hymns of the *Samaveda* (with translation and glossary, Leips. 1848); the *Vollständige Grammatik der Sanskritsprache* (Leips. 1852); a *Chrestomathie* (with glossary, Leips. 1853-54); a *Kurze Grammatik der Sanskritsprache* (Leips. 1855); a *Practical Grammar of the Sanskrit Language* (in Eng. Berl. 1863; 2d ed. 1869); a translation of the *Pantschatantra* (2 vols. Leips. 1859), the original of the 'Seven Wise Masters,' famous during the middle ages in Western Europe; a *Sanskrit-English Dictionary* (1866); and a *Geschichte der Sprachwissenschaft* (Berl. 1869).

Bengal, Bay of, a portion of the Indian Ocean from Ceylon and Sumatra to the mouth of the Ganges. It receives several large rivers: the Salween and Irrawady on the E., the Brahmaputra and Ganges on the N., the Mahanady, the Godavari, the Krishna, and the Kaveri on the W. The ports of any historical importance occur chiefly on the E. coast, such as Aracan, Negrais, Syriam, Martaban, Tavoy River, and King's Island. But since the conquest of Pegu in 1852 gave the British the entire coastline, the growing coasting trade has called into existence new ports, such as Moulmein (q. v.), Rangoon (q. v.), and Akyah (q. v.), on the E. or Burman side, Chittagong (q. v.) on the N.E., Morrellgunj and Port Canning on the N.W., and on the W. a whole series of roadsteads and harbours opened up by the British India Steam Navigation Company, which carries on a rich coasting traffic right round the bay and the whole peninsula of India, to the head of the Persian Gulf, Aden, and Zanzibar. The Nicobar and Andaman Islands lie in the S. part of the B. of B.

Bengal Presidency formerly denoted the whole of India N. of the Vindhya range, or of British India, except the Bombay and Madras presidencies. But, in fact, the term 'presidency' has ceased to have any save a historical or military meaning, India being now divided into 11 provinces. The only remaining trace of the three old presidencies is to be seen in the 'Bengal,' 'Bombay,' and 'Madras' armies, each of which is under a commander-in-chief of its own.

In 1765 the subah of B., Behar, and part of Orissa, was ceded by the Great Mogul to the E. India Company, and shortly thereafter the Presidency of Calcutta, which had been separated from that of Madras in 1707, was merged along with the above territories in the B. Presidency, the ruler of which was raised by Act of Parliament in 1773 to the rank of Governor-General of the Company's dominions. Many years of active annexation stretched the boundaries of B. from the Indus to the Irrawaddy, and from the Himalayas to the Deccan, but from 1854 to 1861 this vast territory was gradually divided into (1) the so-called N.W. Province; (2) the province of B. as it now exists; (3) the lieutenant-governorship of the Punjab; (4) the chief-commissionership of Oude; and (5) that of British Burmah.

Bengal, the largest and wealthiest province of British India, is bounded N. by Nepal, Sikkim, and Bhotan; E. by Assam; S. by the Bay of B.; S.W. by Gondwana or Central Provinces; and W. by the N.W. Province. Area (including Assam), 248,231 sq. miles; pop. (1872) 66,856,859, of whom 19,822, exclusive of the army, are British-born—a greater proportion than in any other part of India. Till 1874, B. comprised the divisions of Lower Bengal, Behar, Orissa, Chota, Nagpore, and Assam, with the adjacent hills; but in the February of that year Assam (with Cachar and Sylhet) were taken from the B. lieutenant-governorship to form the new chief-commissionership

of Assam, with Shillong for its summer, and Gowhaty for its administrative centre. Some two-thirds of the inhabitants of B. are agriculturists. The country, which is extremely flat throughout, is intersected by a multitude of streams, and is partly covered by dense forest and impenetrable jungle. Chief among the rivers are the Brahmaputra and Ganges, which unite about 100 miles from the sea, the former augmenting the volume of the latter, which has already been diverted into a multitude of streams to form the most wonderful delta in the world. In this bewildering network of rivers, the most important for navigation are the Hooghly of Calcutta, formed of the Bhagarutti, the Jellinghi, and the Sunderbuns or Sunderbans Passage. The level surface of the delta is in great part inundated during the rainy months (July and August), sometimes the districts flooded having an area of 100 miles. Great destruction is also caused by the streams when swollen changing their courses; but these dangers have been partially mitigated by the construction of dams and embankments of 2100 miles in extent. Above the delta the two great rivers have many tributaries; and so complete is the intercommunication of B., that almost no spot is 20 miles removed from a navigable stream. Some 30,000 boatmen are employed on the Lower Ganges alone. B. has an equable climate, the mean temperature at Calcutta for May 1871 being 84° 2'; for July, 83° 2'; for December, 69° 8'; and the annual rainfall varying from 50 to 85 inches. Over the maritime tracts of B. the monsoons prevail. The soil is richly alluvial, producing abundance of rice, various other grains, jute and reha fibres, hemp, opium, indigo, silk, sugar, cotton, tobacco, coffee, tea, and the quinine-yielding chinchona. An immense tract of iron and coal is said to exist. There are various manufactures of which perhaps cotton is the most important. Salt is manufactured in great quantities, but the industry was abandoned by the Government in 1863, since which time it has nearly ceased. In 1872-73 the salt imported, chiefly from England, France, Madras, Bombay, and the Persian Gulf, was 247,782 tons, yielding £2,660,369 of duty. Calcutta is the capital of B. P., as it is the metropolis of all India; and among other cities of importance are Serampore, Moorshedabad, Dacca, Burdwan, Purneah, Hooghly, Midnapore, Bancorah, and Berhampore. The great public works of B. are the Orissa Canal (q. v.) and the East Indian and East B. Railway. There are fifteen colleges (ten government institutions and five private colleges aided) affiliated to the university, the chief of which are those of Calcutta, Hooghly, Dacca, Kishnaghur, Berhampore, and Patna. In 1873 they were attended by 1163 students. B. was conquered from the Moorshedabad viceroy of the Great Mogul by the E. India Company (1757) in a single battle gained against immensely superior numbers, and was formally ceded in 1765. Although prodigally fertile, B. is exposed to an occasional failure of crops, and is therefore liable to such visitations of famine as happened in 1873. See Sir George Campbell's *Report on Administration of B. for 1871-72*; *Annals of Indian Administration for 1872-73*, edited by Dr George Smith (Serampore, 1874); *The Moral and Material Progress and Condition of India during 1872-73*, an official report, by Clement L. Markham (Lond. 1874); *Descriptive Ethnology of B.*, by Col. E. T. Dalton (Cal. 1874); Dr. Hunter's *Rural Life in B.* (1875), and *Stat. Acc. of B.* (20 vols. 1877).

Bengal Hemp, the fibre of *Crotalaria juncea*, called also Sunn, Sun, Shunum, Taag, &c., used in Bombay and Madras along with jute for making gunny bags. Jubbhupor hemp is obtained from *C. tenuifolia*, a variety probably of *C. juncea*.

Bengali, the name given both to the native of Bengal Proper (q. v.) and to the language which they use. The former are a mixture of the old indigenous Hindus and of the descendants of those Mohammedan conquerors who held the land for 300 years. The B. tongue is a descendant of the ancient Sanskrit, and is allied to Hindi, but is mixed with Arabic and Persian words traceable to the Mohammedan conquest. It is spoken by 30,000,000 of people, and has been used for literary purposes since the 16th c. B. literature, however, for the most part consists of translations from the ancient Sanskrit. See Long's *Descriptive Catalogue of B. Works* (1855). The best grammars are those of Haughton (1821) and Yates (1847); the best lexicons those of Haughton (1841) and Gordon (1837). See INDIA, LANGUAGES OF.

Bengal Kino, or **Butea Gum**, an astringent substance obtained from *Butea frondosa*, and resembling Kino (q. v.) in

its properties. In India it is used in tanning, in diarrhoea and similar diseases, &c.

Benga'zi (Arab. *Ben-Ghazi*), a seaport in the province of Barca, regency of Tripoli, lies on the E. coast of the Gulf of Sidra, on a sandhill which is separated from the mainland by a salt strand. The town has a dreary look from the sea, which is slowly eating away the barren soil. At the extremity of the tongue of land stands the castle of the governor, a large ruinous building. The only notable building in B. is a Franciscan monastery recently erected. The harbour of B. is fast filling up with sand, and can only be entered by small ships. The bazaars are still tolerably well provided, though the trade of B. has almost vanished since caravans have ceased to come from the S. The people are engaged in agriculture, and export some corn and cattle to Malta. England, France, and Italy have still consuls here. Pop. about 7000.

Bengel, Johann Albrecht, a German theologian, born at Winnenden, in Württemberg, 24th June 1687. He studied at Tübingen from 1703 to 1707; in the latter year he became curate of Metzingen, and in 1708 theological tutor in his college. In 1713 he was appointed teacher at Denkendorf; provost at Herbrechtingen (1741); consistorial councillor and prelate at Alpirsbach, Württemberg, where he died, 2d December 1752. B.'s fame rests mainly on his recension of the Greek text of the New Testament, which paved the way for the labours of later editors. Wesley's *Notes on the New Testament* are for the most part abridged from the *Novum Novi Testamentum* of B. (Tüb. 1742). His prophetic studies are *Kürze Offenbarung St. Johannis* (Stuttg. 1746, Reutl. 1850), and his *Ordo Temporum a Principio per Periodos Economicæ Divinæ* (Tüb. 1741, Stuttg. 1753), belong to that unfortunate department of religious literature the cultivation of which, in the long-run, is damaging both to the intellect and reputation of a scholar. See Burk, *B.'s Leben und Werke* (Stuttg. 1831), and *B.'s Literarischer Briefwechsel* (Stuttg. 1836).

Benguella, a country of Lower Guinea, Western Africa, extending from Cape Negro on the S. to the river Coanza on the N. It is hilly, well watered, rich in minerals, and abundant in the tropical and sub-tropical plants and animals common to the W. coast of Africa. The climate is unhealthy on the coast, but healthier in the interior. The inhabitants belong to the Congo race, and use the Bunda language. They are mostly fetish worshippers of a low order; but perhaps the slave-trade, still carried on by the Portuguese, who are the nominal masters of the country, has hindered their progress. The capital, **San Felipe de B.**, is situated on the coast, near the mouth of the Catumbella, in a beautiful but unhealthy vale, and has a pop. of 1500, of which three-fourths are free blacks, mostly converted to Catholicism, though still practising many heathen rites. The harbour is good, but not much frequented; and so utterly dull and lifeless is the place, that the Portuguese themselves call it 'Hell.' See Jams, *Die Portug. Besitzungen in Südwestafrika* (Hamb. 1845).

Be'ni, a river of Bolivia, S. America, 645 miles long, flowing through the provinces of Moxos and B., and forming with the Mamore the Madeira, one of the largest tributaries of the Amazon.

Benicarlo, a seaport town in the province of Castellon, Spain, on the Mediterranean, about 85 miles N.E. of Valencia by rail. It carries on a considerable export trade in full-bodied wines, which are mixed with claret and other French wines. Pop. 6060.

Be'ni Hassan, a village in Upper Egypt, situated on the right bank of the Nile, is chiefly noted for the fine grottos and catacombs in its neighbourhood, which were probably intended as sepulchres by the principal families of the ancient Hermopolis, which stood on the other side of the river. The number of grottos is about thirty, cut out of the calcareous rock of the district. On the walls are to be seen many interesting hieroglyphics and paintings.

Beni-Is'rael ('sons of Israel'), a remarkable race inhabiting the island of Bombay and adjoining coast, and numbering about 8000 or 10,000. In appearance they are a little fairer than the other natives of India of the same rank, and their physiognomy indicates a union of Jewish and Arabic blood. They are all circumcised, and receive the whole of the Old Testament Scriptures as of divine authority. They have been settled in India for

many centuries, and probably came thither from Arabia. See Dr Wilson in *Indian Antiquary* for November 1874.

Benin, a kingdom of Upper Guinea, Africa, bounded E. and N. by the Niger, S. by the Bight of B., and W. by Dahomey and Yariba. The coast is low and level, but the land rises gradually to the Kong Mountains. B. is watered by numerous streams, and by some of the branches of the Niger. It is very fertile, and densely populated. Palm oil, salt, jasper, slaves, skins, &c., are exported in considerable quantities. The language of B. belongs to the many-membered family of languages spoken by the B. peoples or the negro tribes in and about the delta of the Niger, as far W. as Dahomey, and as far E. as Bonny. The capital, B., on the river B., a branch of the Niger, has a population of 15,000, and has still an active trade, though the abolition of slavery has diminished its prosperity.

Benin, Bight of, part of the Gulf of Guinea, on the W. coast of Africa, extending from Cape Formosa on the E. to Cape St Paul on the W., a distance of 370 miles. The shore is low, marshy, sandy, and intersected by numerous rivers. Palm oil and ivory are the chief articles of trade.

Beni-Souef, the chief town of a province of the same name in Central Egypt, and one of the principal places of trade in the country, on the left bank of the Nile, about 70 miles S. of Cairo, lies in a fertile region, and is the centre of business for the Fayûm valley. It has cotton-mills and alabaster quarries. In the neighbourhood a fair is held in spring, in honour of the saint Shilkâni, which has greatly increased in popularity of late years, and now attracts large crowds. Mounds of rubbish, but no distinct ruins of an older town, are found all about the place. Pop. about 6000.

Benit'ier (Fr. *benir*, to bless), or **Benatu'ra**, the vessel in which holy water is held in Roman Catholic churches. It is either movable, for use in processions, or fixed near the door, convenient for the people to dip their fingers in as they enter or leave the church.

Ben'jamin (Heb. 'son of the right hand,'—i.e., 'of good fortune') was the youngest of Jacob's sons (Gen. xxxv. 18), and the head of one of the tribes of Israel. When Jacob went down to Egypt the family of B. consisted of ten sons; at the first census in the wilderness the tribe numbered 35,400 men fit to bear arms; and at the second, 45,600. The territory of the tribe lay between Ephraim and Judah. Along with the latter tribe it formed the kingdom of Judah.

Ben'jamin of Tudela, a Spanish Jew who lived in the 12th c. If the title of his itinerary, which he wrote in Hebrew, could be believed, he travelled (1159-73) through Europe, Palestine, Mesopotamia, the Indies, Ethiopia, and Egypt. His citation of authorities and geographical errors show, however, that a great deal of his materials must have been gathered from hearsay, if he ever travelled at all. B.'s work has been often printed, and translated into Latin, English, Dutch, and French. The latest edition, that of Asher (Lond. 1841), contains a vocalised text, and an English version with learned notes.

Benjamin-Tree. See BENZOIN.

Ben Lawers (Gael. *Beinn Laubhair*, 'the resounding' or 'noisy mountain,' perhaps so called from its stormy situation or roaring cataracts), the highest mountain of Perthshire, some 32 miles W.N.W. of Perth, overhanging Loch Tay, and commanding a splendid prospect. It is 3935 feet high, and rises so gently that its ascent can be made on horseback. On its summit are found the small gentian, round-headed cotton-grass, and other Alpine plants.

Ben Led'i (commonly read in Gaelic as *Beinn-le-Dia*, 'hill of God,' but more correctly *Bein-Shleibhte* or *Shleibhtean*, the 'mountain of mountains,' or the 'mountain girl with sloping hills'), a mountain in the S.W. of Perthshire, near Loch Katrine, and 4 miles W.N.W. of Callander. It is 2836 feet high, and is beautifully situated at the entrance to the Trossachs (q. v.).

Ben Lo'mond (Gael. *Beinn Loman* or *Leamhan*, 'the mount of the elm,' probably so called from the 'elms' that grew about its base; the name *Leamhan* (Eng. *Leven*) is also given to the river that flows out of the loch), a mountain in the N.W. of Stirlingshire, on the E. side of Loch Lomond, some 27 miles

W.N.W. of Stirling, forming the southern extremity of the Grampian range, and reaching a height of 3192 feet. Its N. side is precipitous, but on the S.E. it rises gradually. B. is clad with vegetation to the summit. It is formed chiefly of mica slate, but quartz, greenstone, and felspar-porphry also occur. The view from the top in clear weather is remarkable for its singular beauty and extent, ranging from the fertile Lothians, the winding Forth, and the Castle of Edinburgh on the E., to the Atlantic, the Isles of Arran and Bute, and the Irish coast on the S.

Ben Macdhu'i (Gael. *Beinn Macduibhe*, 'the mountain of the son of darkness,' or the 'dark mountain'; others, less probably, read it *Beinn Muic Duibhe*, 'mountain of the black sow'), one of a group of mountains, forming a spur of the Grampians, in the S.W. of Aberdeenshire, and, next to Ben Nevis, the highest peak in Great Britain, being 4296 feet high.

Bennett, James Gordon, one of the most successful journalists in the United States, and founder of the *New York Herald*, was born at Newmill, Keith, Scotland, about the year 1800. He studied with a view to the priesthood at a Roman Catholic seminary at Aberdeen, but gave up this aim, and came to America in the year 1819. B. first went to Halifax, N.S., where he taught a school; and afterwards became a proof-reader in Boston. In 1822 he was engaged on a newspaper in Charleston, S.C. He soon returned to the North, engaged in newspaper-work in New York, and sometimes lectured. His earlier attempts were not always successful, but at length he found his career when he started the *New York Herald*, the first number of which appeared May 5, 1835. The paper soon attracted notice by its lively reports of the money and stock market, its startling personalities, sensational descriptions, and fresh news; and it ultimately yielded a large fortune to its adventurous editor and owner, who died June 2, 1872.

Bennett, Sir William Sterndale, a well-known English musician, the son of a Sheffield organist, was born in 1816. He studied at the Royal Academy of Music in London, and later on made the acquaintance at Dusseldorf of Mendelssohn, to whose inspiration his works show that he owed much. He died 1st February 1875. B.'s compositions are numerous—including overtures, concertos, sonatas, &c.—but although pleasing in themselves, have scarcely sufficient originality to become permanently popular.

Ben Nevis (Gael. *Beinn Nìomhais*, 'the bright or clear mountain,' so called perhaps from the snow that lies long on its top, or from the light colour of the rocks that form its summit), a mountain in the S. of Inverness-shire, the loftiest in Great Britain, having a height of 4406 feet. It consists at the base of granite and gneiss, and in its upper part, which is entirely destitute of vegetation, of fine brown porphyry. B. is steep, rugged, and difficult of ascent, and snow often rests on its top or lurks in its clefts throughout the year. *Nìomhais* is an Aryan word, the root occurring in Gr. *nip-to*, to wash; Gael. *nìg*, to wash; Lat. *niv-is*, snow. The river Nevis, which flows round the southern base of the Ben, is remarkable for the clearness of its waters.

Benn'gsen, Levin August Theophil, Count von, a celebrated Russian general, born at Brunswick, February 10, 1745. After spending some time in the Hanoverian service, he entered the Russian army in 1773, fought under Rumänzov against the Turks (1787), and in 1791 was intrusted by the Empress Catherine with the execution of her designs against Poland. Having fallen into disgrace with the Emperor Paul, he became one of the leaders in the conspiracy against that monarch, and his presence of mind contributed much to its success (1801). Intrusted with the command of the Russian army of the N. in 1805, he obtained in 1806 a slight advantage over Napoleon at Pultusk, commanded at Eylau (1807), led the Russian centre at Borodino (1812), and defeated Murat at Woronowa on the 18th October following. A difference with Kutusov made him retire from the Russian service for a short time, but in 1813 he commanded the Russian reserves in Saxony, and fought bravely at Leipsic, where the Emperor Alexander created him Count on the field. In 1818 B. retired to his paternal estate of Banteln in Hanover, and died there, October 3, 1826. B. wrote a work *On the Knowledge Indispensable to a Cavalry Officer* (Riga, 1794 and 1803).

Ben-Huta. See BEN, OIL OF.

Ben-Ehydding, a celebrated hydropathic institution, beautifully situated on an eminence on the right bank of the Wharf, 16 miles N.W. from Leeds, Yorkshire. The building was erected in 1846, and has considerable accommodation and extensive grounds. Under its late director, Dr M'Leod, who died in January 1875, this establishment acquired a great name.

Ben'ahie, or **Ban'shee** (Irish Gael. *bán* or *bean*, a woman, and *sihe*, a fairy; but this derivation is doubtful), in the superstition of Ireland and the Scotch Highlands, is a female fairy, who wails and shrieks when a death is about to take place in any family whose interests are dear to her.

Bent Grass (*Agrostis*), a genus of grasses, more than 170 species of which are distributed over the world. In Britain there are several species, some of which are called *Bents* in some parts of the country, a name, however, given by others more especially to the crested dogstail (*Cynosurus cristatus*). These are: *Agrostis alba*, forming a large portion of our natural pastures, and having several agricultural varieties, one of which, the Fiorn grass (*A. stolonifera*), is a useful grass for moist grounds; *A. canina*, of heaths and moorlands; *A. setacea*, and *A. Spica-venti* (dog-II.), an annual grass, sown in grain. Herd grass (*A. dispar*), a native of the United States, was at one time cultivated in Britain, but is at the present time more highly esteemed in France than in this country.

Bentham, Jeremy, the real founder of the Utilitarian school of philosophy, and an eminent writer on jurisprudence and legislation, was born at London, 15th February 1748. He was educated at Westminster School, and Queen's College, Oxford, where he graduated B.A. at the age of sixteen, and M.A. at twenty. He studied at Lincoln's Inn for the bar at the request of his father, and was 'called' in 1772, but practised only for a short time. 'I found it more to my taste,' he says, 'to endeavour to put an end to these abuses (i.e., in the Court of Chancery) than to profit by them.' When a boy, he had been nicknamed 'the philosopher,' from his tendency to speculation, and he now devoted himself to the criticism of ethics and legislation. His first work, *A Fragment of Government*, which was an ingenious criticism of Blackstone's *Commentaries*, was published in 1776, and brought him into notice. It was followed by his *Principles of Morals and Legislation* in 1780; his *Defence of Usury* in 1787; his *Introduction to the Principles of Morals and Legislation* in 1789 (new ed., Clar. Press, 1876); *Discourses on Civil and Penal Legislation* in 1802; *A Treatise on Judicial Evidence* in 1813; and *The Book of Fallacies* in 1824. M. Dumont, who translated several of his works into French, has done more than any one else to popularise his master's theories. B.'s father dying in 1792, he succeeded to property to the value of from £500 to £600 a year, and lived in competence till his death, at Westminster, 6th June 1832. His works have been collected and edited by Dr Bowring and Dr Hill Burton. The last has also given to the world *Benthamiana* (Lond. 1838), containing a memoir of B., an essay on his writings, and the passages setting forth most of his leading doctrines. B.'s views have had a great deal of influence on the present time. Although he did not invent, he was the first to popularise, the theory of the 'greatest good of the greatest number,' which is at the foundation of Utilitarianism. It is easy to criticise B. severely as a thinker, and still more as a writer. He was somewhat impatient, not a little eccentric, and latterly prolix and vain; but he gave incontestable evidence of power by creating a school of philosophy, and by educating disciples who surpassed their master. Utilitarianism as a system may not be destined to finally triumph, but it has at least secured the service of distinguished names—Mill, Romilly, Dumont, Burton, &c.

Benthamia, a genus of plants of the natural order *Cornaceæ* (q. v.), named in honour of George Bentham, one species of which, *B. frugifera*, of Nepaul, has ripened its fruits in the S. of England.

Bent'nick, the name of an historical family, which, as early as the 14th c., was settled in Gelderland, and was afterwards transplanted to England and Oldenburg. The elder or English branch was founded by Jan Willem van B. (born 1648),

third son of Hendrik B. of Diessenhan, in Overysel. From his boyhood Johann was a friend and favourite of William of Orange, was repeatedly employed by him in affairs of state, and in 1689 was raised to the English peerage as Baron of Cirencester, Viscount Woodstock, and Earl of Portland. His eldest son, Henry B., obtained in 1716 the title of Duke of Portland and Marquis of Litchfield, and in 1721 was appointed Governor of Jamaica, where he died, 14th July 1726. His son and heir, William B., born 1st March 1708, married Margaret Cavendish, sole daughter of the Earl of Oxford, and heiress of the Duke of Newcastle.—**William Henry Cavendish B.**, eldest son of the preceding, born 4th April 1738, succeeded to the dukedom 1st May 1762. During the North American war he steadily adhered to the opposition. In 1783 he became first Lord of the Treasury, but on the 27th December of the same year had to give way to the Pitt administration, and remained in opposition till 1792, when he began to support the Government against the French Revolution. In 1794 he was appointed Home Secretary, and held this office till Pitt's resignation in 1801. On the dissolution of the Whig ministry in 1807, he was again placed, in spite of his great age and mediocre abilities, at the head of the Government, and died prime minister, 30th October 1809.—**William Henry Cavendish B.**, second son of the preceding, born 4th September 1774, entered the army, rose rapidly, and in 1803 was appointed Governor of Madras. Recalled some years later, he was first employed in diplomatic service, and subsequently placed at the head of an English brigade in Spain. Later, he was sent to Sicily as commander-in-chief of the English auxiliary forces, and plenipotentiary to the court of King Ferdinand, where his high-handed conduct so offended the haughty Queen Caroline, that in 1811 she went to Vienna to conclude an alliance with her mortal enemy Napoleon. B. now interfered decisively in the affairs of the island, and drew up, in 1812, a constitution for the Sicilians, which was abandoned after the fall of Napoleon. In 1827 he was appointed Governor-General of India, and signalled his administration by establishing the overland route, forbidding the burning of widows, reorganising the finances, and establishing the liberty of the press. To this day his name is venerated by the Hindus. He died at Paris, 17th June 1839.—**William Henry Cavendish Scott B.**, eldest brother of the preceding, and fourth Duke of Portland born 24th June 1768, was made president of the Privy Council in 1827, and died 27th March 1854. By his marriage with a daughter of General Scott, a sister-in-law of George Canning, he had four sons, of whom, owing to the death of the eldest in 1824, the second, **William John Cavendish Scott B.**, born 17th September 1800, succeeded to the ducal dignity, and still (1875) survives.—**William George Frederick Cavendish B.**, better known as **Lord George B.**, and once famous as a Conservative leader, was the brother of the foregoing, and was born 27th February 1802. After being in the army for some time, he entered Parliament in 1826 as member for Lynn-Regis. He voted for the principle of the Reform Bill, but ultimately became a member of the Conservative party which acknowledged Sir Robert Peel as its head. When Peel, however, became an advocate of free trade, B., along with Mr Disraeli and others, separated from him, and formed themselves into the Protectionist party. Of this party B. became the leader in the House of Commons, and the speeches which he delivered against the Peel Government were believed to have contributed greatly to its overthrow in 1846. He died suddenly of heart-disease, 21st September 1848. His biography as a politician has been written by Mr Disraeli, his successor in the leadership of the Conservative party in the House of Commons. Among the measures which B. supported during his parliamentary career were those for the emancipation of the Roman Catholics and the removal of the civil disabilities of the Jews. B. was much attached to the turf, but was also strongly opposed to the dishonest practices frequently associated with it. See Disraeli's *Lord George B., a Political Biography* (Lond. 1851). The younger or Oldenburg branch does not possess any historical importance, and has only attracted notice from a wearisome lawsuit among its members regarding the ownership of property.

Bentley, Richard, 'by far the greatest scholar that England has ever produced,' born at Oulton, near Wakefield, January 27, 1662. In 1676 he entered St John's College, Cambridge, as

a subeizar, and took the degree of B.A. in 1680. After acting for a year as head-master of Spalding Grammar School, he became tutor to the son of Dean (afterwards Bishop) Stillington, and in 1689 he removed with his pupil to Oxford, where both were members of Wadham College. B.'s first publication was a Latin letter to Dr Mill (1691), containing notes on his edition of the *Chronicle of Malala or Malelas*. In 1692 and 1694 he was chosen to preach the Boyle Lecture on the Evidences of Natural and Revealed Religion. During his long and active literary labours B. prepared notes and emendations to the texts of Callimachus, Horace, Terence, Phædrus, Aristophanes, Manilius, Homer, &c., some of which were published by himself, while not a few were contributed to enrich the editions issued by other scholars. Some of his most ambitious schemes, particularly his famous proposal to restore the text of the New Testament to its condition at the time of the Council of Nice, were never accomplished. The Phalaris controversy and his protracted college quarrel were the most prominent events in B.'s life. Sir W. Temple, in his *Essay on Ancient and Modern Learning*, had declared the Letters of Phalaris to be the best Letters in the world. Boyle issued an edition of the Letters, the preface of which contained a reflection on the courtesy of B. as King's Librarian. B. took his revenge by appending to Wotton's *Reflections* an attack on the genuineness of the Letters. Boyle, aided chiefly by Atterbury, issued a Reply; and in answer to this Reply there appeared, in 1699, B.'s famous *Dissertation*, the wit, learning, and sagacity of which secured its author's enduring fame. In 1700 he was appointed Master of Trinity College, Cambridge, next year Archdeacon of Ely, and chaplain both to William and Mary. His college reforms provoked the hostility of the Fellows, and a feud commenced, of which it may suffice to say that it issued in a legal process which lasted for twenty-six years, and during which B. repeatedly displayed the arrogance, and even ferocity, by which his character was disfigured. He died July 14, 1742. His works, in three volumes, have been edited by the Rev. Alex. Dyce. See *Life of B.* (2 vols. 1831) by Dr James Henry Monk, and De Quincey's biographical and critical essay.

Ben'turong, or **Binturong** (*Arctictis*), a genus of carnivorous mammalia intermediate in position between the Civets (q. v.) and Racoons (q. v.), and inhabiting India and the E. Archipelago. They are nocturnal animals, and possess long, hairy, prehensile tails. Two species are known.

Ben'ue, or **Bin'ue**, at one time also erroneously called *Tchadda*, because it was supposed to have a connection with the great lake of Sudan, a large river of Central Africa, forming the principal eastern tributary of the Niger, which it joins about 250 miles above the mouth of that river. Dr Barth regards it as the best means by which to communicate with the interior, seeing that the tract of land separating the basins of the B. and the Shari, which flows into Lake Tchad, is a flat alluvial region not more than 20 miles in breadth. Its sources are, however, still unknown, although several expeditions have been undertaken with a view to reach these, of which the most important are those of 1833 (Laird, Allen, and Oldfield), 1851 (Dr H. Barth), by far the most fruitful in results, and 1854 (Baikie), in which the steamship *Pleiad* penetrated as far as Gurowa, and its boats still further to Dulti, about 280 miles from the mouth of the B. This expedition ascertained that the name Tchadda was unknown to the natives. The expeditions of Vogel in 1855, of Baikie in 1857, and of Dr Nachtigal in 1872, did not add much to our previous knowledge.

Benyovaky, Moritz August, Count of, born at Verbowa, Hungary, in 1741. He entered the Austrian army at the age of fourteen, served in the Seven Years' War, where his courage and capacity were conspicuous, and afterwards made several voyages from Dantzic to Hamburg and Plymouth. In 1767 he joined the Polish Confederation, and as general of cavalry contributed much to gain several victories over the Russians. Taken prisoner in 1769, he was banished to Kamtschatka, whence he contrived to escape in May 1771, with ninety-six companions, and arrived in September of the same year at Macao in China, the fugitives having suffered incredible hardships on the passage. From Macao he sailed for France on the 14th of January, arriving there in August 1772. The French Government proposed to him the founding of a colony in Madagascar. Reaching that island, 14th February 1774, he was in 1776 elected king by the chiefs.

Being at last driven from the island, he entered the Austrian service. On the 25th of December 1783, he made an unsuccessful proposal to the British Government to found a colony in Madagascar. Receiving private aid, however, both in England and America, he sailed from Baltimore, U.S., for Madagascar, arriving there 7th July 1785, but was killed, May 23, 1786, by a party of French soldiers sent from the Isle of France. B. was a man of singular intrepidity, love of adventure, and knowledge of character, who, on a wider field and with larger resources, might have made for himself a distinguished place in history. B. wrote in French *Voyages et Mémoires* (Par. 2 vols. 1791). The year before, an English translation of this was published at London by Nicholson.

Benzer'ta, Lakes of, the ancient *Hippionitis Palus* and *Sisara Palus*, distant from Tunis 30 miles N.W., the former salt and the latter fresh. The fisheries are let by the Bey of Tunis for £4000 per annum. They are close upon each other, and connected by a channel.

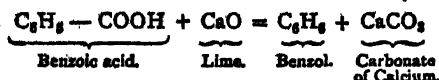
Benzo'ic Acid is a white crystalline substance, having the formula $C_7H_5O_2$ or C_6H_5-COOH , and the properties of a monobasic acid. It was discovered at the commencement of the 17th c.; and was first obtained by subliming gum benzoin, from which circumstance it received the name of *flowers of benzoin* or *bengamin*. It is contained in gum tragacanth storax, Peru and Tolu balsam, in Botany Bay resin, &c. It is prepared commercially either by the sublimation of benzoin, or from the urine of the Herbovera, which contains *Hippuric Acid* (q. v.). On allowing the urine (generally that of oxen) to putrefy, the hippuric acid is resolved into B. A. and other products. The urine, after putrefaction, is neutralised with milk of lime, filtered, evaporated to small bulk, and treated with hydrochloric acid; the B. A. is then precipitated, and may be purified by sublimation. B. A., when quite pure, has no smell, but it is usually contaminated with a minute quantity of some substance, which gives it a pleasant aromatic odour. It is readily soluble in alcohol and ether, and also, though to a less extent, in water. When heated, it melts, and sublimes at about 145° C. If further heated, it boils, and may be distilled unchanged at 239° C. It combines with bases to form crystalline salts—benzoates—which are for the greater part soluble in water. Neither the salts nor the aci' itself have any practical importance. Taken internally, B. A. becomes converted into hippuric acid, which is excreted in the urine.

Benzoin, in chemistry, is the camphor of bitter almond oil, which deposits after the commercial essential oil has been kept for some time. The pure essential oil can be entirely converted into B. by the action of a dilute alcoholic solution of cyanide of potassium.

Benzoin (Gum), or **Gum Benjamin**, a fragrant resinous exudation from a tall tree (*Styrax Benzoin*) found growing in Siam and the islands of the E. Indian Archipelago. The pleasant odour of B. becomes powerful and distinct on heating, and when it is melted by heat it gives off a vapour composed of B. acid. B. is a light-brown resin, mottled with patches of white somewhat opalescent matter, but in inferior varieties the white patches are small or altogether wanting. It burns with a dull smoky flame, evolving a pleasant resinous odour, and it is very largely used as incense in religious rites and for preparing perfumer's pastilles, as well as for varnishes. B. contains, in addition to a volatile oil, three different kinds of resin and *Benzoic acid*. In commerce two varieties of the substance are recognised—Siam B. and Sumatra B., the last of which is the purest and most valuable.

Benzol', or **Benzine'**, is a liquid hydrocarbon, having the composition represented by the formula C_6H_6 . It was discovered by Faraday amongst the products of the compression of oil gas, and was called by him *bicarburet of hydrogen*. It is now prepared in large quantities from coal tar. The tar is subjected to a preliminary distillation, and the portion passing from 60°–200° C. collected by itself (*light oil*). The light oil is then treated with sulphuric acid to remove nitrogen bases, and after washing with water and a dilute solution of caustic soda, is again distilled—the liquid passing between 80°–200° C. forming the B. of commerce. Pure B. is obtained from the commercial article by repeatedly subjecting it to the action of a freezing-mixture: the B.

crystallises out, leaving the impurities in the liquid condition. It may also be obtained pure by distilling a mixture of benzoic acid and lime—



B. is a volatile liquid, lighter than water (sp. gr. '899), and possesses a peculiar aromatic odour. It boils at 80° C., and solidifies to a crystalline mass a little below 0° C. It combines with Nordhausen sulphuric acid to form *B. sulphuric acid*, $\text{C}_6\text{H}_5\text{SO}_3\text{H}$. It is readily acted upon by bromine and chlorine, part of its hydrogen becoming replaced by these elements. Nitric acid acts upon it to form *Nitro-B.* or *essence of mirbane* (artificial oil of bitter almonds), $\text{C}_6\text{H}_5(\text{NO}_2)$. B. has become of immense importance as the source of Aniline, and Aniline Colours (q. v.). It is an excellent solvent of fats, resins, sulphur, phosphorus, some of the alkaloids, &c., and is much used for removing grease-stains. It is very combustible.

The study of B. and its compounds has developed a new field in theoretical chemistry, and is at present largely occupying the attention of scientific chemists. Compounds derived from B. are known as *aromatic substances*, on account of their occurrence in most aromatic bodies.

Beowulf, the oldest heroic poem in the Germanic languages, and one of the earliest relics of English literature, was originally composed (according to Mr Kemble), about the time of the Teutonic invasions of England, though the extant version is probably not of earlier date than the 7th c. Mr Thorpe (*Beowulf*, 1855), believes that the present version was paraphrased from 'an heroic Saga composed in the S.W. of Sweden, in the old common language of the N., and probably brought to this country during the sway of the Danish dynasty.' Mr Arnold (*Beowulf*, 1876) argues strongly in favour of its English origin, and assigns it to the 8th c. Mr Oliphant (*Standard English*, 1873, chap. i.) says—'B. is to us English what the *Iliad* was to the Greeks. The old epic, written on the mainland, sets before us the doughty deeds of an Englishman before his tribe had come to Britain. The notion that the poem is Pagan in spirit will not stand the test of a close scrutiny. Throughout there is the most ample recognition of a righteous and overruling God, and the whole of the wild creations of Norse mythology are derived from Cain, the first murderer. The scene is laid mainly in Denmark, but the writer displays no familiarity with local colouring, and would scarcely have written as he did had he been a Dane. The poem consists of 6357 lines, and, besides its philological value, is interesting from its wild energy and picturesque glimpses of the old northern hero-life. It tells how B., nephew of the king of the Geatas (Goths of S. Sweden), sails in a 'foamy-necked' ship over the 'swan-path' to Hrothgar, king of Denmark, whose residence, named Heort, is ravaged by 'a grim stranger, Grendel, a mighty hunter in the marshes.' B. tells the king he will watch for Grendel by night alone. Grendel enters the hall, and, as he is impervious to steel, B. tears his arm from the shoulder, and drives him into fenland. The conqueror is rewarded with praises and gifts; but Grendel's mother devours a friend of the king's by night, and changes joy to lamentation. This female monster dwells in a ghostly land, which is powerfully described. B. determines to seek her; 'better 'tis,' he says, 'for every one that he his friend avenge, than that he greatly mourn. Each of us must an end await of this world's life: let him who can work high deeds ere death.' He plunges beneath a gloomy flood, passes hideous monsters, and meets and slays 'the she-wolf of the abyss, the mighty sea-woman.' He is afterwards made king of the Geatas; rules for fifty years; is slain in fight with a fiery dragon, and is buried on a headland overlooking the sea, in accordance with his request that they should raise him a mound 'at the sea's naze, that seafarers afterwards may call it B.'s Mount, those who their foamy barks over the mist of floods drive from afar.' The Geatas lamented his fall, bewailing him as the mildest and kindest of kings and men.

B. describes a heroic age curiously similar to the heroic age described in Homer. It brings before us the feast in the mead-hall, with the chief and his health-sharers, the customs of the banquet, the rude beginnings of courtly ceremony, the boastful talk, reliance upon strength of hand, and the practical spirit of

adventure that seeks peril as a commercial speculation—for B. is undisguisedly a tradesman in his sword' (*Morley's English Literature*). B. is the valiant, rough hero whom Christianity and chivalry are to soften and transform into the ideal knight-errant. He is noble and generous, and undergoes incredible dangers for the sake of his fellow-men. So superhuman are his exploits, that Mr Kemble is uncertain whether to regard him as a historical or mythical personage, although inclined to identify him with a Norse god of agriculture, as the Saxons had a harvest-month named Beo. Mr Thorpe is disposed to regard B. as a contraction of Beadwulf ('wolf of battle' or 'slaughter'), although it may, in the earliest version, have appeared in the form Biae or Bave. But whatever disputes there may be as to the origin of B., there can be none as to the power of the poem. It is pervaded by a sombre melancholy, totally unlike the sunny, changing animation of Homer. Though composed by a Christian *Scop*, it is still the work of a man who sympathised with the old traditions of his Pagan sires. The adventures and exploits of the hero are invested with all the picturesque surroundings of Norse superstitions. There is only one MS. of B. extant, executed, according to Mr. Thorne, in the first half of the 11th c. See Kemble's *B.* (1833, 2d ed. 1837); Kemble's *Translation of B.* (Pickering, 1837); Thorpe's *B., Text and Translation* (Oxford, 1855); Arnold's *Text and Translation* (Lond. 1876); and the German editions by C. W. M. Grein (2 vols. Göt. 1857-59), and Moritz Heyne (Paderborn, 1863, new ed. 1873).

Beipur, a thriving seaport on the W. coast of India, in the district of Malabar, province of Madras, 6 miles S. of Calicut. Iron ore is found in the vicinity, and there is a considerable trade in timber. B. is the terminus of a railway across the peninsula from Madras. Pop. about 6000.

Bequeath, to bestow personal property on any one by testament. In so disposing of real estate the proper term to use is *devise*. In Scotch law also, B. is only applied to movable (personal) estate. See LEGACY, WILL.

Bequest is a legacy of personal property. See LEGACY, WILL.

Béranger, Pierre Jean de, called by Thiers the French Horace, and certainly after Napoleon the most popular Frenchman of this century, was born at Paris, 19th August 1780. During the Revolution he lived at Péronne, where his aunt kept an inn, and where he was taught in one of the national schools conducted on Rousseau's principles. Here he was taught history, geography, and composition, but no Latin. After helping his father for a few years in a doubtful financial business, he adopted literature as a profession. Passing over his *Hermaphrodites*, and various religious effusions, his *Meditation* and *Pèlerinage*, all of which were composed between the ages of sixteen and twenty-two, and are unripe, imitative, and mediocre, we may note the first flashes of original genius in those incomparable *chansons* with which he solaced his early poverty in Paris. Till 1803 he was, indeed, very poor; but in *Les Guux* and *Roger Bon Temps* we see the gaiety and courage of his nature. From M. Lucien Bonaparte he got employment (1805) on Landon's *Annales du Musée*, and an *honorarium* from the Institute, which he afterwards generously gave to De Beauchamps. In 1809 he became a clerk to the university at £80 salary, where he remained till 1821. By 1813 his *Petit Homme Gris* and *Roi d'Yvetot* were well known; he joined a literary society called the 'Caveau.' His first book of songs appeared in 1815, after which he is known as the poet of the Opposition. Though a sincere republican, B. expressed frank admiration for the Emperor; and his disgust at some political conversions, and the irreverent expressions in his poem *Le Bon Dieu*, involved him in a prosecution, resulting in fine and imprisonment. He was defended by the elder Dupin. In 1825 and 1828 he published more songs, and shortly before the revolution of July was again imprisoned and heavily fined, the society 'Aide-toi' subscribing a large part of the fine. B. was intimate with Manuel, Lafitte, Thiers, and Dupont, and also with Hugo, Sainte-Beuve, Lamennais, and Chateaubriand. He steadily resisted the advice of his friends to enter political life, and even declined to put himself in nomination for the Academy, on the ground that election would compromise the independence of a *chansonnier*. After 1833 he wrote little, but in 1848 he was against his will elected by 200,000 votes member of the Constituent Assembly

for the department of the Seine. He declined to act. He died at Paris, 16th July 1857. B.'s fearless praise of liberty under the Empire, and of the Emperor under the Restoration; his keen sense of national glory, and of the joys of wine and grisettes; his vivid expression of the freedom and gaiety possible for the poor; above all, his exquisite versification, have made him a classic. His character and philosophy may be seen in two expressions: 'It is wealth to have few wants and many friends.' 'Those who are not selfish must be economical.' France has his songs by heart, and may read in them her own strength and weakness. They are irresistibly charming, but inspire no heroism. Editions of his works are innumerable. One of the finest is the *Œuvres complètes de P. J. de B.* (Par. 1835-36; new ed. 1857). See also *Ma Biographie* (Par. 1857), *Correspondance de B.* (4 vols. Par. 1859-60), and Jules Janin's *B. et son Temps* (Par. 1866).

Berar', formerly a Mahratta state, now under the British government of India, lies to the N. of the Nizam's territory; also known as the Hyderabad Assigned Districts. It is a fertile, well-watered region, and has been called 'the garden of India.' The chief natural product is cotton. In 1853 it was annexed by British rule, and consists now of an eastern and western division of the same name. The chief town is Ellichpore (q. v.). Area, 16,960 sq. miles; pop. (1871) 2,231,565.

Berat', an Albanian town of some importance, situated on the Beratina (ancient *Apsus*), about 92 miles S. of Scutari. Pop. estimated at 9000. B. gives the name to a Greek archbishopric.

Berbera, one of the most important trading stations in E. Africa, is situated on the N. coast of Somâli, 100 miles S. of Aden, at the head of a deep and finely sheltered bay. The harbour is the largest and best on the Somâli coast. It belongs to a Somâli people who dwell in the interior, and are rich in camels, oxen, and sheep. Two tribes of this people, the *Ajâl-Juner* and the *Ajâl-Achmed*, have the privilege of establishing a market here once a year, though not of directly buying and selling. They act as protectors, landlords, negotiators, interpreters, &c. In October they come down from the interior in small caravans, with all requisites for erecting bazaars and magazines; and by the end of November, when the N.E. monsoon favours sailing from Arabia, Persia, India, and E. Africa, thousands of buyers and sellers come from the ports of the Red Sea, from Aden, Muscat, Bassorah, Bombay, Zanzibar, &c., and a great scene of bartering begins. In March the barques gradually leave the bay, and early in April the last of the Somâli are gone, and the harbour and bay are left to solitude till the next season. Among the exports are hides, ostrich feathers, gum-arabic, drugs—especially myrrh, odoriferous resins, coffee, senna, wax, honey, &c. The principal imports are rice, maize, dates, cotton goods, iron, tin, zinc, copper, &c.

Berberida'ceæ, or Barberry order, a natural order of Dicotyledonous plants, herbs, or shrubs, with watery juice. 'Leaves alternate, compound or divided, usually without stipules. Flowers perfect: calyx of three to nine sepals, imbricated in one to several rows, often coloured. Petals as many as the sepals, and in two sets, or twice as many, often with a pore, spur, or glandular appendage at the base. Stamens equal in number to the petals, and opposite them, or rarely more numerous. Anthers extrorse, the cells commonly opening by an uplifted valve. Carpels solitary, often gibbous or oblique, forming a one-celled pod or berry in fruit. Seeds one, two, three in number, embryo (often minute) surrounded by a fleshy or horny endosperm' (Gray). Found in the temperate parts of Europe, America, Asia, and in the mountainous parts of India. There are about 110 species, and 12 genera, most of which have acid (owing to the presence of oxalic acid), astringent, and bitter properties. The Mahonias are beautiful flowering-plants of our gardens; a decoction of the roots of one of them (*M. aquifolia*), of N.W. America, is used by the natives and backwoodsmen of that region as a bitter tonic and in venereal diseases. The fruits of some are eaten, while the stem roots of others furnish a yellow dye. A large shrubby form (*M.* or *Berberis Balfouriana*) was discovered in Vancouver Island, and introduced into this country by Dr Brown in 1864. The Blue Cohosh (q. v.) and the Mandrake of America (*Podophyllum peltatum*) belong to this order. The latter plant has drastic properties.

Berbers, the name generally given to the indigenous pop. of N. and N.-W. Africa. They occupy a vast region, stretching from the eastern edge of the Libyan Desert, as far W. as the Atlantic, and from the negro states of Sudan to the shores of the Mediterranean. Whatever differences have been made in their fortunes by the course of history, under whatever different names they have come to be known, they are essentially one race, and conform to the same type, not only in language, but also in colour, features, and figure. Recent ethnographers and philologists have proposed to call them the *Hamitic*, or, with Herodotus, the *Libyic* race, in opposition to the *Ethiopic*, or black population of Africa. Unquestionably they are of the same stock as those nations of antiquity known as Mauri or Mauretanians, Numidians, Getulians, Phazanians, Nasamoneans, the Lybians of the Syrtes region, of Cyrenaica, of Marmarica, and of the desert oases of Augila and Ammonium. The Arab invasion and conquest in the 7th c. was probably the most powerful external influence that ever affected the B. It introduced among them a new language (Arabic), and a new religion (Mohammedanism), both of which have permanently established themselves, yet the native language of the B. is still in use, and their ancient characteristics have not disappeared. The most important of the Berber peoples are—1. The *Amazirghi* or *Amasigh*, properly *Masigh*, about 2½ millions in number, who inhabit northern Morocco, the whole of the Rif (where they were formerly dreaded for their piracy), and the northern part of the Atlas range as far as the province of Tedla. They are for the most part independent of the sultans of Morocco, and live either under hereditary princes of their own race, or in small republican communities. They breed cattle, dwell in villages, and occasionally (like Highland caterans) make predatory excursions into the more fertile plains in their neighbourhood. The Amazirghi are, in general, of a somewhat fair complexion; slender, but handsome in body; and brave, but revengeful in disposition. They are sworn enemies of all Europeans. 2. The *Shilluh* or *Shellah*, in southern Morocco, about 1½ millions in number, who occupy partly the great plain along the Omm-er-Rebiah and Tensift, and partly the southern Atlas, to its farthest spurs towards the Atlantic. They follow industrial and agricultural occupations, trade in European manufactures, and live in large towns and villages. In complexion they are darker than the Amazirghi, and are powerfully built, but possess a higher culture. Offshoots both from the Amazirghi and Shilluh have become nomads, and wander about in Bedouin (q. v.) fashion along the great level wastes south of the Atlas, such as the plain of Taflelt (q. v.), which is even named after the Amazirghi tribe of the Filâli. 3. The *Kabyles* (q. v.), in Algeria and Tunis, whose number is officially stated to be about 960,000. 4. The B. of Sahara, who inhabit the various oases scattered over that immense region. The most notable tribes are the Beni-Mezâb or Mozabites, the B. of Gadames, of Sokna on the frontiers of Fezzan, of Augila, of Ammonium, but above all, of the wide-spread and far-ruling nation of the Imosharh or Tuareg. These Imosharh, the purest, i.e., the most unmixed, of all the B., occupy the western oases between Ghadames, Tuât, Bilma, and the Niger, and have almost exclusive control of the great caravan trade between the Sudan and the seaports of the Mediterranean. See Barth's *Travels in Central Africa* (vol. i.); and Hanoteau's grammatical works on the Berber languages of the Kabyles and the Tuareg.

Berbice', the eastern division of British Guiana, S. America, has an area of 750 sq. miles, and a pop. of 30,000, of whom over 400 are whites. It is watered by a river of the same name, which is navigable for upwards of 150 miles. The chief products are sugar, coffee, and cotton. Near the mouth of the river B. stands New Amsterdam, the chief town and seaport, with considerable exports of rum, sugar, raw cotton, and timber.

Berco'to, a town of Italy, province of Parma, and 26 miles S.W. of the city of Parma, on the edge of the Apennines (*Lo Cisa Pass*), with a fine Gothic church, and a pop. of 3000.

Berch'ta (old High Ger. *Perahta*, 'shining,' 'white'), a spiritual being regarding whom there are stories in S. Germany and Switzerland similar to those about Hulda ('gracious,' 'benign') in N. Germany. Originally, beyond doubt, a heathen goddess, an embodiment of the kindly power of Nature, she sank with the spread of Christianity into a bugbear for frightening children. Frau B. was also, in particular, a severe taskmistress of spinners, and queen of the crickets, represented with a long iron

nose and very big foot. The *Perchten* springs and brooks in Salzburg and the Tyrol, probably also the *Bachtelag* in Switzerland, are probably memorials of the fact that B. was once an object of worship. The name B. has in modern times become *Bertha*.

Berchtesgaden, a market-village of Bavaria, on the Ache or Alpe. It is near the Austrian frontier, a little to the E. of which, at Frauenreuth, are the government saltworks, worked since the year 1174, and yielding annually about 7500 tons of salt. Pop. 1900.

Ber'cy, a place on the outskirts of Paris, within the fortifications, formerly a separate town, now part of the capital, has numerous distilleries and sugar-refineries, with manufactures of chemical products, but is best known as the chief depôt of the wines and brandies intended for the capital.

Berdianak', a Russian seaport town, government of Taurida, on the N. of the Sea of Azov, is a place of great commercial activity, with mines of salt and coal in its neighbourhood. In 1828 it was an insignificant village, but, by the efforts of Prince Voronov, was raised to a town, and has since continued to prosper. Pop. (1867) 12,465.

Berditchev', or **Berdy Ozew**, an important trading town of Russia, government of Kiev, on the Gnilopjat, 92 miles W.S.W. of Kiev, and not far from the borders of Volhynia, to which historically it belongs. It is the private property of Prince Radzivil. B. has manufactures of tobacco, silks, perfumes, tallow candles, oil, wax, leather, &c., and is besides the centre of the S. Russian trade with Germany. B. has two weekly and five annual markets, the most important being held on the 12th June and 15th August, when the chief articles of trade are furs, silks, glass, ironware, woodwork, salt, fish, corn, sugar, cattle, and horses. Pop. (1867) 52,787, among whom are a considerable number of Jews.

Bere'ara, so named from those inhabitants of Berea mentioned honourably in Acts xvii. 11; known also as Barclayans, from their founder, the Rev. John Barclay (1734-98); an unimportant Christian sect in Scotland, whose doctrines, in the main Calvinistic, embrace such peculiarities as that unbelief is the unpardonable sin, that saving faith is accompanied by assurance, and that the Bible alone reveals to us the existence and character of God.

Berengar I., King of Italy, was the son of Eberhard, Duke of Friuli, and of Gisela, daughter of the Emperor Ludwig the Pious. When the various Frankish kingdoms agreed to depose Charles the Fat, and choose each a ruler for itself, B. was crowned King of Italy at Pavia in 888; but he never had a secure hold over the country, and his career is nothing but a record of sanguinary struggles. By the aid of Arnulf, the King of the Germans, or E. Franks, whom he acknowledged as his 'overlord,' B. was finally victorious over a formidable competitor, Guido, Duke of Spoleto. Guido dying in 894, his son Lambert wrested from B. a share in the sovereignty of N. Italy, and retained it till his assassination in 898. Meanwhile, the Magyars ravaged the N. and the Arabs the S. of Italy, and the Italian nobles, enraged with B. for not chastising the enemy, called in Ludwig, King of Lower Burgundy, who was crowned at Rome in 901. Four years later his nobles again revolted, and invited Rudolf of Burgundy to help them, who inflicted so decisive a defeat on B., 29th July 923, that the latter was driven to solicit the aid of the Magyars. This brought upon him the hatred of all Italy, and he was assassinated in the following year. B. left by his first wife, Bertila, two daughters, Gisela and Bertha, of whom the first married the Marquis Adalbert of Ivrea.

Berengar II., son of the Marquis Adalbert, and grandson of B. I., married Willa, niece of Hugo (Count of Provence), then King of Italy, in 934. Threatened by Hugo for having conspired against him, he took refuge at the court of the Emperor Otho I., whence he returned to Italy with an army in 945. In 950 he assumed the title of king, the interval being occupied by the rule, less real than nominal, of Lothar, the son of Hugo, whose death Willa is supposed to have compassed by poison. As a security for his power, he wished Adelheid, the widow of Lothar, to marry his son Adalbert, his associate in the regal power. She implored the protection of the Emperor Otho, who married her himself, and, in 952, reduced B. to the condition of a feudatory of the empire. But he soon took up arms again,

and the emperor was forced in 955 to send an army against him under his son Ludolf, who conquered B., but too generously gave him back both his crown and freedom. In 957 Ludolf died, it is said, of poison administered by Willa; and now B.'s tyranny became so odious that Otho himself was forced to come to Italy (961) and put him down. In 964 he was compelled by famine to surrender the mountain fortress in which he had taken refuge; and being sent as a prisoner to Bamberg, in Bavaria, he died there in 966.

Berenga'rius, a famous schoolman, was born at Tours in 998, became a canon of the Cathedral of Tours (1030), Archdeacon of Angers (1040), and died in 1088. He rendered himself famous by his opposition to the Romish doctrine of Transubstantiation, which had been formulated, and, as B. affirmed, introduced into the Church, by Paschasius Radbertus in the 9th c. He was induced, under successive popes, to sign three different statements of belief regarding the Eucharist, more or less of the nature of recantations. As far as his own opinion can be gathered from his controversy with Lanfranc, he denied the doctrine of Transubstantiation, but held as nearly as possible the Lutheran doctrine of Consubstantiation. For a long time nothing was known of B.'s writings save some letters, but in 1770 Lessing discovered at Wolfenbüttel the MS. of his reply to Lanfranc on the Eucharist controversy, which was, however, first published by the brothers Vischer, under the title *B. Turonensis de Sacra Cena adversus Lanfrancum Liber Posterior* (Berl. 1834).

Bereni'oe, the name of several celebrated Egyptian and Jewish princesses. *Egyptian*.—1. B., second wife of Ptolemy Soter, celebrated by Plutarch as the first in virtue and wisdom of Ptolemy's wives.—2. B., daughter of Ptolemy Philadelphus, and wife of Antiochus II., of Syria, by whom she was put away. B. was then murdered by the partisans of Laodice, the former wife of Antiochus.—3. B., daughter of Magas, King of Cyrene, and wife of Ptolemy Euergetes. She dedicated her hair in the temple of Venus for her husband's safe return from Syria. It was removed, it is said, to form a constellation, and was celebrated by Callimachus in a poem, which was translated by Catullus. B. was put to death by her son, Ptolemy Philopator.—4. B., daughter of Ptolemy Lathyrus, and wife of Alexander II., grandson of Ptolemy Physcon. She was murdered by her husband nineteen days after marriage.—5. B., daughter of Ptolemy Auletes, and eldest sister of Cleopatra, filled the throne from her father's expulsion, B.C. 58, till his restoration, B.C. 55, when she was put to death. She was the wife successively of Seleucus and Archelaus. *Jewish*.—1. B., daughter of Costobarus and Salome, was married first to Aristobulus, and afterwards to Theudion.—2. B., daughter of Agrippa I., was thrice married: to Marcus, son of Alexander the Alabarch; to her uncle Herod, King of Chalcis; and to Polemon, King of Cilicia, whom, however, she soon deserted to return to her brother Agrippa. After the capture of Jerusalem, she went to Rome, where the indignation of the people alone prevented Titus from raising her to his throne.

Berenice (mod. *Sakdyt-el-Kubli*), an ancient Egyptian town on the Red Sea, built by Ptolemy Philadelphus; once a great emporium of trade with the East, but now interesting only for its ruins, the chief of which is the small sandstone Temple of Serapis, containing sculptured figures in basso-relievo, and hieroglyphics. In the vicinity of B. are emerald-mines. B. was also the name of four other ancient towns, the most noteworthy being *B. Panchryson* (the 'all-golden'), also on the coast of the Red Sea. Here the Egyptians found their great supplies of gold, employing prisoners and criminals in the extensive mines.

Beresford, William Carr, Viscount, one of the most eminent of the lieutenants of the Duke of Wellington, was an illegitimate son of George De la Poer, first Marquis of Waterford, born 2d October 1768. He entered the army in 1785, served with distinction in various parts of the world, and in 1808 joined the British army in Portugal. He fought at the battle of Corunna under Sir John Moore, and, after covering the embarkation of the troops, returned with them to England. In 1809, B. was appointed commander of the Portuguese army, succeeded in restoring discipline to it, and was rewarded with the honour of Marshal of Portugal. The skill with which he rapidly transformed swarms of rude peasants into active and intelligent soldiers was never surpassed. Under Wellington he played a brilliant

part, winning the battle of Albuera, May 16, 1811. He was severely wounded at the battle of Salamanca, took Bordeaux, February 27, 1814, and was present at the battle of Toulouse. B. was created in 1814 Baron, and in 1823 Viscount B. From January 1828 to November 1830 he was Master-General of the Ordnance under the Wellington administration. Many Spanish and Portuguese titles were conferred upon him. He died without issue, at Bedgebury Park, Kent, 8th January 1854.

Beresina, or **Berezi'na**, a river of Russia rising in the government of Minsk, which, after flowing in a south-easterly direction for about 240 miles, joins the Dnieper. It is connected with the Duna by the B. canal. Borissoev, about 170 miles from its junction with the Dnieper, is the scene of the disastrous passage of the retreating French army under Napoleon, on November 27, 1812.

Berez'na, a town in the government of Tchernigov, Russia, on the Desna, 24 miles E.N.E. of the town of Tchernigov. It contains several churches, and has some trade. Pop. 9678.

Berezov, or **Beresof** ('the place of birch-trees'), a town in the government of Tobolsk, Siberia, on the Sosva, a tributary of the Obi. It lies in the midst of wide cold wastes, but has an important trade in skins and furs, and a great annual fair. Prince Menschikoff and Count Ostermann both suffered punishment and died here during the 18th c. Pop. 1570. There is another B. in the eastern government of Perm, Russia, near which are many gold-mines.

Berg, formerly a duchy of Germany, was a distinct state as early as the 12th c., but first became an independent duchy in the 14th c. After many changes of dynasty it came into the possession of Bavaria, who ceded it to France in 1806. Napoleon I. enlarged it, raised it to a grand-duchy, and conferred it first on Murat, and then on the Crown Prince of Holland. At the peace of 1815 it was given to Prussia. B. now forms part of the circles of Arnsberg, Cologne, and Düsseldorf, in Rhenish Prussia.

Berg, in German, Dutch, Frisian, and Swedish, signifies a 'hill,' and this sense the word retains, under all its forms, in the other Teutonic dialects: *Bjerg* in Dan., *Bearg* in Icel. and Norweg., *Barg* in Low Ger., and *Borck* or *Borg* in Old Eng., also mean a hill. But a hill is a natural 'defence' or 'protection,' and so the word came to acquire the secondary meaning of a mound, rampart, fortification, or refuge, in which sense it survives in mod. Eng. under the form of 'Barrow' (q. v.). The Ger. *Burg* and the Old Eng. *Burh* (mod. 'borough,' 'bury,' and 'burgh') are only modifications of the original form to denote particular applications of the idea of 'defence.' A *burg*, or *burh*, is simply a 'protected' place, walled, stockaded, or otherwise defended, as distinguished from an open and defenceless hamlet.

Berga, a town in the province of Barcelona, Spain, near the Lobregat, 52 miles N.W. of Barcelona. It is commanded by a castle with a strong battery. The trade consists in the produce of the neighbouring country; cotton fabrics are also manufactured. Pop. 6333.

Bergama, the ancient *Perгамos* (q. v.), situated about 40 miles N. of Smyrna, in the vilayet of Aidin, Asiatic Turkey, on the Bakur-Chai, has numerous and splendid remains of its former greatness—temples, palaces, amphitheatres, aqueducts, &c. Pop. about 15,000.

Bergamo, an ancient and important town in the N. of Italy, province of B., is charmingly situated on several small eminences, the highest of which is crowned by a castle, between the rivers Brembo and Sexio, 29 miles N.E. of Milan. Pop. (1872) 37,363. B. is the seat of a bishop, and has an academy of painting and sculpture, a museum, a lyceum, a public library of 50,000 vols., and considerable manufactures of silk, cotton, and iron, besides a large trade in grindstones made in the neighbourhood. Among its numerous churches the Santa Maria Maggiore, the old Arian church San Alessandro della Croce, San Bartolomeo, San Andrea, Santa Maria del Sepolcro, and Santa Grata, are distinguished by their age, their beauty, and their pictures. The great fair or festival of San Bartolomeo is held in August, in the suburb of San Leonardo, in a large stone building erected for the purpose, and containing 600 stalls or booths, where business is done valued at more than a million sterling. B., anciently Bergamum, was a Roman *municipium*, was destroyed by the Huns in the 5th c.,

gave name to a Lombard duchy, accepted the protectorate of the Venetian republic in 1427, and remained in this relation till the conquest of Italy by Napoleon at the close of the 18th c. It is the birthplace of Bernardo Tasso, the father of Torquato, and of Tiraboschi, the historian of Italian literature.—The province of B., mountainous in the N., but belonging in the S. to the fruitful plain of Lombardy, has an area of 928 sq. miles, and a pop. (1872) of 368,152. The inhabitants, who are noted for the rudeness of their dialect, have the reputation of being fat and good-natured, but cunning.

Bergamot, the fruit of *Citrus bergamia*, an ally of the common orange, cultivated in the S. of Europe. From its rind is obtained the B.-oil which is very largely employed in cheap perfumery and as a flavouring essence in cookery. B.-oil is a yellow essential oil, with a strong citrine odour, obtained by expression. It thickens considerably with age, and deposits a solid white substance called B.-camphor.

Bergedorf, a town and territory between the Elbe and the Bille, belonging to Hamburg, Germany. The territory formerly belonged to both Hamburg and Lübeck, but in 1867 the latter town resigned its share in the government to Hamburg for 200,000 thalers. Pop. of town (1872) 3600, chiefly engaged in husbandry and cattle and poultry rearing. Pop. of territory, part of which is known by the name of Vierländer ('Four Lands'), 12,510.

Bergen, the capital of a province or stift of the same name, and, next to Christiania, the chief trading town of Norway, situated on the Vaagen, a deep inlet of the sea. It is strongly fortified, and has a capital harbour, which is, however, somewhat difficult of access. It is the see of a bishop, and the principal building is the cathedral; but there are various other handsome churches, municipal and charitable institutes, besides an inferior law court and public libraries. There is a naval squadron stationed here, and the chief industry is the herring trade; the export in this item alone amounting to some 200,000 tons annually. B. also exports great quantities of dried fish, cod-liver oil, skins, and feathers. The imports are for the most part brandy, wine, corn, cotton, woollens, coffee, and sugar. Pop. (1875) 34,384, including the suburbs of *Sandviken* and *Skudeviken*. The town was founded by Olaf Kyrre in 1069, and during the middle ages was the most important Hanse town in Norway. The earliest foreign treaty ever made by England was entered into with B. in 1217. In 1348 the black pestilence broke out in B., whence it spread throughout the kingdom, and it has frequently reappeared in the town.—The province of B. has an area of 9628 sq. miles, and a pop. (1875) of 238,854. It extends along the coast, and has much fishing and cattle-rearing.

Bergen-op-Zoom, a town and fortress in N. Brabant, Holland, on the small river Zoom, where it enters the E. branch of the Scheldt, and 17 miles N.N.W. of Antwerp. Its defences are strengthened by its being situated on an elevation surrounded by marshes and sands, which are covered by the tide at high water. It was a stronghold of the Netherlands in their war with Spain, and withstood successfully many formidable attacks; and after the works were added to by Cohorn it was deemed impregnable. It was taken, however, twice by the French; first in 1747, and again in 1794; but the British, who, under Sir Thomas Graham, attempted to surprise it on the night of March 8, 1814, were repulsed with immense loss. The French gave it up under the treaty of Paris. The principal trade is in anchovies, and earthenware is manufactured. Pop. 9139.

Bergerac, a town of France, department of Dordogne, in a fertile plain on the right bank of the Dordogne, 26 miles S.S.W. of Périgueux. It is ill-built, with narrow winding streets. Over the Dordogne is a bridge of five arches. The chief manufactures are liqueurs, chemical stuffs, paper, serges, hosiery, and earthenware. Several brandy-distilleries, tanneries, iron-foundries, and smelting-furnaces are in the neighbourhood, and the department is noted for its wines. B. owes its origin to the Abbey of St Martin, founded in 1080; was originally a strong fortress, and played an important part both in the English and Huguenot wars. Louis XIII. demolished the fortifications in 1621. Pop. (1872) 8024.

Berghaus, **Heinrich Karl Wilhelm**, a celebrated geographer, was born at Kleve, in Rhenish Prussia, May 3, 1797.

educated at Münster, and held the chair of Mathematics in the Berlin Architectural Academy from 1824 to 1855. His chief cartographical works are *Atlas von Asien* (1833-43), the famous *Physikal. Atlas* (90 plates, Gotha, 1838-48; 2d ed. 1849-51), and a *Sammlung hydrogr.-physikal. Karten der Preuss. Seefahrer* (Berl. 1840-48). The principal of his many important geographical writings are his *Allgem. Länder- und Völkerkunde* (Stuttg. 6 vols. 1837-41); *Die Völker des Erdballs* (Brün. and Leips. 2 vols. 1845-47); *Deutschland seit hundert Jahren* (Leips. 5 vols. 1859-62); *Was man von der Erde weiss* (Berl. 4 vols. 1856-60); and *Briefwechsel mit A. von Humboldt* (Leips. 3 vols. 1863).—**Hermann B.**, a nephew of the former, born 16th November 1828, is also well known as a geographical engineer, having published a *Karte des Oesthaler Gletschergebiets* (Gotha, 1861), a *Weltkarte in Mercator's Projektion* (Gotha, 1859), and together with Von Stülpnagel the splendid *Chart of the World* (8 plates, Lond. 1863).

Berghem, or **Berchem**, **Nikolaas**, a famous Dutch painter and engraver, was born at Haarlem, 1624, and died there 18th February 1683. His works, chiefly landscapes with cattle, are very numerous, a result both of his own industry and of the avareice of his wife, who kept him close at his easel. The striking qualities of his works, the excellence of which has carried them into all the good collections of Europe, are exquisite taste, and a quality of rich, truthful, and harmonious colour, which time has not been able to sensibly deteriorate. B.'s larger works have been sold in Paris for 24,000 fr. His etchings are much sought after.

Bergk, **Theodor**, a German philologist, was born at Leipsic, 22d May 1812, studied under Beck, Hermann, and Dindorf, and after many changes of residence, finally settled as professor at Bonn in 1869. B.'s services to the criticism and elucidation of the Greek poets are of great value. His chief works are the *Poeta Lyrici Græci* (Leips. 1843; new ed. 3 vols. 1853-67); *Commentationes de Reliquiis Comædiæ Atticæ Antiquæ* (Leips. 1838); his edition of *Aristophanes* (2 vols. Leips. 1852; 2d ed. 1857), and of *Sophocles* (Leips. 1857); but he has also executed numerous smaller works displaying fine scholarship and familiarity with all contemporary research.

Bergler, **Joseph**, a German painter, born at Salzburg in 1793, studied in Italy, and exhibited his 'Betrayal of Samson' at Parma, from the academy of which it obtained the first prize. He was appointed director of the academy at Prague in 1800, and died there in 1829. Besides a number of fine altar-pieces, B. executed numerous designs and pictures illustrative of events in the history of Bohemia.

Bergman, **Torbern Olof**, an eminent Swedish chemist, was born at Katharinberg, in the province of West Gothland, 20th March 1735. He distinguished himself at Upsala University, where, in 1767, he became Chemistry Professor. Friedrich the Great invited him to Berlin in 1776, but the love of his native land kept him at home. He died in his prime at Medevi, 8th July 1784. Most of his dissertations are collected into six volumes, entitled *Opuscula Torberni B. Physica et Chemica* (Upsala, 1779-94; Ger. by Tabort, Frankf. 1782-99).

Bergmehl, or '**Mountain-Meal**,' a whitish powder, occurring in various recent geological formations, and composed chiefly of the remains of the flinty or siliceous coverings of *Diatomaceæ* (q. v.), or low vegetable organisms. The name 'B.' is derived from the Swedish habit of mixing this deposit with bread and other kinds of food, under the idea that it is nutritious. Deposits of this substance occur in N. Wales, in Ireland, in Mull and in the Hebrides in Britain, and in Norway and Sweden. Probably the remains of Foraminifera (q. v.) are also mixed up with those of diatoms. Analyses of B. show that it contains a certain proportion of organic matter—3 or 4 per cent.

Bergues, a fortified town of France in the department of the Nord, about 5 miles S.E. of Dunkirk, with which it is connected by a canal. There are manufactories of soap and tobacco, also sugar and salt refineries. B. is an old town, and has the ruins of a once magnificent abbey, built by Baldwin IV. Pop. (1872) 5774.

Bergyll, or '**Norway-Haddock**' (*Sebastes Norvegicus*), a genus of Teleostean fishes, of the family *Triglada*, which group is also represented by the gurnards, &c. This fish somewhat

resembles a perch in general form, and possesses the head-plates covered with scales. One long dorsal fin, having its anterior half spinous, exists. The eyes are large, and the teeth small and very numerous. The B. inhabits the northern seas, and occurs on the eastern coasts of Britain. It is coloured red, and is lightest in colour on the under parts. Its average length is 1½ or 2 feet. Its flesh is nutritious, the Greenlanders eating it in both the fresh and dried states.

Berhampore, a town of British India, province of Bengal, district of Moorshedabad, on the left bank of the Bhagirathi, a branch of the Ganges, 118 miles N. of Calcutta. It is the seat of a government establishment, and one of the chief British military stations in India, with a college and several churches and hospitals. B. enjoys as healthy a climate as any place in Bengal, great improvement having been lately effected in its sanitary arrangements. At the time of the mutiny this was one of the first places where disaffection showed itself, but before any decided action took place the native troops were disarmed. Pop. (1872) 27,110.—B. is also the name of a town and military station in the province of Madras, district of Ganjam, situated in a wide plain, 525 miles N.E. of Madras, and 325 S.W. of Calcutta. Pop. 20,000.

Beriberi, or **Bad Sickness of Ceylon**, is a name given to a serious disease, unknown in this country, but not unfrequent in Ceylon and India. The name B. is a reduplication of a word signifying *weakness*, and means great weakness. B. is characterised by great prostration, poverty of the blood, numbness of the surface of the body, and general dropsy, not only in the limbs, but into most cavities of the body. The disease often breaks out among troops and convicts. It is generally a fatal disease. Treatment consists in warm clothing, good diet, purgatives, and diuretics. It is stated that a residence of eight or twelve months is necessary before the disease manifests itself.

Berie, a town of British India, province of the Punjab, executive district of Rohtuk, 36 miles W. by N. of Delhi. Pop. (1871) 9723.

Berja, a town of Spain, in the province of Andalucia, 22 miles W. of Almeira, situated on the S. slope of the Sierra de Gador, the lead-mines of which employ most of the inhabitants. There is also some trade in wine and oil, and considerable linen, leather, and hardware manufactures. Pop. 8000.

Berkeley, a small borough-town in Gloucestershire, on the Avon, a mile and a half E. of its junction with the Severn. The Vale of B., in which the town lies, is a rich pasturage, and noted for its milk and cheese (the famous 'Double Gloucester'). Dr Jenner, the discoverer of vaccination, was born and is buried in B. B. Castle, to the S.E. of the town, was the scene of the murder of Edward II. Pop. (1871) 1161.

Berkeley, **George**, Bishop of Cloyne, and one of the most illustrious metaphysicians of the 18th c., was the eldest son of William B., and born on the 12th March 1684, at Kilcrlin, near Thomastown, Kilkenny, Ireland. He was educated at Trinity College, Dublin, where he made the acquaintance of Swift. In 1713 he went to London, and became the esteemed friend of Addison, Pope, and the other wits and literary men of the day. When the Duke of Grafton was made Lord-Lieutenant of Ireland, B. became one of his chaplains, and in 1724 was promoted to the Deanery of Derry. In 1728 he sailed to America to establish in the Bermudas a missionary college for the conversion of the Indians, but not being supported by the government of Sir Robert Walpole, the scheme failed, and he returned to England, to become in 1734 Bishop of Cloyne. The duties of his diocese he discharged with zeal, and twice refused to give up his see. In 1752 B. removed to Oxford with his son—he had married in 1728 Anna Elvert, the daughter of the Right Hon. John Forster, Speaker of the Irish House of Commons—and on the 14th of January 1754, he was seized while reading with palsy of the heart, and died almost instantaneously. Besides being one of the most energetic churchmen and amiable men of his day, to whom justly 'every virtue under heaven' was ascribed, B. was one of the subtlest thinkers that Great Britain has produced. In a series of works mainly intended to rebut materialism, scepticism, and atheism, of which the most important are his *Treatise concerning the Principles of Human Knowledge*, published in 1710, and *Three Dialogues between Hylas and Philonous*, published in 1713, he advocated

absolute idealism, and denied the existence of the external world. This philosophy, laughed at when first promulgated, is now looked upon as one of the most complete schemes of metaphysics ever given to the world, although it is undeniable that it paved the way for the scepticism of Hume. Among B.'s other works are his *Theory of Vision* (1709), intended to demonstrate the dependence of our perceptions of distance, magnitude, &c., on the sense of touch; and two books on the virtues of tar-water. Various editions of his works have been published. The latest, and incomparably the best, is that by Professor Fraser of Edinburgh, who has also written his *Life* (1874). The language used by Mr G. H. Lewes when speaking of B. is simply just: 'There are few men of whom England has better reason to be proud than of George B., Bishop of Cloyne. To extraordinary merits as a writer and thinker he united the most exquisite purity and generosity of character, and it is still a moot-point whether he was greater in head or in heart.'

Berkeley Sound, an inlet on the N.E. of E. Falkland Island, much frequented by trading vessels on account of its good harbour.

Berkhamstead, Great, or St Peter's, a market-town of Hertfordshire, 22 miles W. of Hertford, and 28 miles N.W. of London, on the North-Western Railway. It lies in a valley, on the Bulborne, and on the Grand Junction Canal, and has some trade in timber, malt, and coals. There are also manufactures of chemicals, straw-plait, and fancy wooden wares. B. was a residence of the kings of Mercia, and was the place where the English nobles and prelates obtained from William the Conqueror an oath that he would govern according to the laws of Edward the Confessor. William gave the manor of B. to his half-brother the Earl of Moreton, who built on it a strong castle. The property, however, was seized by the crown in the reign of Henry I., and was conferred by Edward III. on his son, the Black Prince, when he created him Duke of Cornwall. It has since belonged to the Princes of Wales. The free grammar-school of B., founded in the reign of Edward, is still in existence. There are several other charitable foundations. The poet Cowper was born here. Pop. (1871) 3940.—**B. Little**, a beautiful village, four miles S.W. of Hertford, with a pop. (1871) of 408.

Berkshire, one of the most picturesque counties of England, lies between Hampshire and the Thames, and has an area of 752 sq. miles, and a pop. (1871) of 196,475. It is intersected by a tract of chalk-hills or downs, and is formed in the N. of coral-rag, in the S. of tertiary, and of chalk and greensand in the centre. The chalk range is a continuation of the Chilterns, and rises to a height of 893 feet in White Horse Hill, so called from a rude outline of an immense horse on its chalky side. The rich vale of Kennet lies S. of this range, and is watered by the stream of the same name. Along the entire N. boundary, a course, with windings, of 100 miles long, flows the Thames, receiving as tributaries the Kennet, Ock, and Leddon. In the E. of the county is Windsor Castle (q. v.), with its famous forest and park. The chief crops of B. are barley, oats, and wheat, and in 1873, 370,317 acres were under tillage. There is much pasture, and an extensive trade in dairy produce, including 'Double Gloucester' and 'pine-apple' cheese. The breeding of horses, cattle, swine, and other live-stock is carried on; but there are no important manufactures. Two canals and the Great Western Railway are the chief means of transit. Three members of Parliament are returned by B., besides two by the county town, Reading, and one each by Abingdon, Wallingford, and Windsor. B., originally *Bearescyre*, 'bare-oakshire,' so called (according to Bosworth) from the polled oak in Windsor forest where public meetings were held, is a county rich in British, Roman, and English antiquities, has many fine churches, and several old castles.

Berleng'as, the name of some twelve barren islets off the coast of Estremadura, Portugal, 8 miles N.W. of Carvoeira. Barlenga, by far the largest, is fortified, and gives name to the group.

Berlichingen, Götz von, born at Jaxthausen, near Hornberg, Würtemberg, in 1480. He was one of the many petty feudal lords in Suabia, who, holding their fiefs direct from the Emperor Maximilian, were entitled to *Faustracht* (club-law), or

the privilege of private feuds, as if they were important sovereigns. Götz was present at the Diet of Worms (7th August 1495), when the Imperial Council formally abolished this right. Nevertheless, he always acted on the principle that on a just cause he was entitled to declare hostilities: as he did against Nürnberg in 1513. At the siege of Landshut he lost his right hand, which was supplied by an iron one. He was opposed to the Suabian league, and his friendship for Ulrich of Würtemberg made him an object of hostility to the Emperor, who twice put him under ban. When in 1525-26 the Suabian peasants rose to demand freedom from certain taxes, and a free choice of clergy, Götz put himself at their head. He was in consequence imprisoned at Augsburg and Jaxthausen for a number of years; but after the dissolution of the Suabian league he served under Karl V. against the Turks (1541), and against the French (1544). He died at his castle of Hornberg, 23d July 1562. Götz seems to have been a simple, brave, frank soldier, with the vices and prejudices of his class and time. He left an account of himself, first published in 1731 (best edition, Busching and Der Hagen, Breslau, 1813), which gives an interesting glimpse of contemporary life. The brilliant drama of this name by Göthe, Gerstenberg's *Ugolino*, and Klinger's *Sturm und Drang*, have been called typical works of the revolutionary literary movement in Germany known by that name. The B. family still exists in the two lines of Jaxthausen and Rossach, to the latter of which Götz belonged, the representative of the former having been his brother, **Hans von B.** (born 1476, died 1553). To the B.-Rossach line belongs **Friedrich Wolfgang G. von B.**, born 26th June 1826, a major in the Austrian army, and a member of the Upper Chamber of Würtemberg. In 1859 he was raised to the rank of a count, and has written *Urkundliche Geschichte des Ritters G. von B. und seiner Familie* (Leips. 1861).

Berlin is the capital of the Prussian monarchy and of the German empire, the chief residence of the Emperor, and one of the finest cities of Europe. It is situated near the centre of the province of Brandenburg, on both sides of the Spree, an affluent of the Havel, occupies a flat sandy plain, badly adapted for sanitary purposes, covering an area of some 22½ sq. miles, and is divided into 16 quarters, of which *Alt-B.*, on the right bank of the Spree, and *Alt-Köln*, on an island, are the oldest, while *Aeusserer Friedrichsstadt* has been built since 1838. The Spree, which cuts B. into two almost equal parts, and is connected by a canal with the Oder, is here some 200 feet wide, and has a slow current. The city is built mainly on a regular plan, and comprises some 596 streets and squares, and some 33,963 buildings, of which over 700 are public buildings, 80 being churches and chapels. Among the principal streets are Unter den Linden, 3605 feet long, and 155 broad, which leads from the Schlossbrücke to the Brandenburg Gate, and contains two double rows of lindentrees; Friedrichsstrasse, 8755 feet long, and having scarcely one foot of slope throughout; Wilhelmsstrasse, stretching away to the new Luisen Gate, with a length of 8652 feet, and Königsstrasse, noted for its trade and traffic. Of the squares, the most celebrated are the Opernplatz, containing an equestrian statue of Friedrich the Great by Rauch (1851); the Lustgarten (1828), one side of which is occupied by the museum; Wilhelmsplatz, with statues of Schwerin, Winterfeld, Seidlitz, Keith, Ziethen, and Leopold of Dessau; Belle-Allianzplatz, in the centre of which is the Victoria column (1843); the Gensdarmenplatz, the largest of the squares; and Leipzigerplatz, the site of the Brandenburg monument. There are several beautiful bridges, as Friedrichsbrücke, 235 feet long, having eight arches; Schlossbrücke, ornamented with eight marble groups of statuary emblematic of war; the Kurfürstenbrücke, built 1692-95, and the Alsenbrücke, built in 1864. A few of the most important buildings are the royal castle, a massive quadrangular building; the Emperor's palace; the palaces of Prince Ludwig, of the Queen of the Netherlands, Prince Karl, the Crown Prince, and Prince Albrecht, and the royal château of Monbijou; the royal armoury and guardhouse, on the model of a Roman castrum; the school of artillery and engineering; the university (formerly Prince Heinrich's palace), containing a large museum; the royal library (710,000 vols. and 15,500 MSS.); the Academy of Science and Art; the Academy of Music; the Royal School of Architecture; the chemical laboratory; the exchange; the mint; the state printing-office; the old museum, built by Schinkel in 1828; the colossal new museum (since 1843), with the fine portico frescoes of Kaulbach; the

national gallery; and the new town-house, opened in 1870. Some of the churches are as old as the 13th c., as the Nikolai or Hauptkirche, the Marien, and the Kloster; among the more modern are the Catholic St Michael's, the Protestant St Thomas's, St Hedwig's Kirche (the Rotunda), the new Synagogue, and the beautiful Dominican Klosterkirche in Moabit, erected in 1869. Notable among the monuments with which B. abounds are the Brandenburg Gate, 82 feet high and 200 wide, built in imitation of the Athenian Propylæa, crowned by a figure of Victory; the colossal equestrian statue of Friedrich the Great by Rauch (1851); the national war-trophy in the Invalids' Park (1854); and the column of victory in the Königsplatz, in commemoration of the recent campaign in France, unveiled 2d September 1873. The chief places of amusement are the opera-house (1843) for 1800 persons; the new theatre (rebuilt by Schinkel, 1817) for 1500; the Luisen theatre, formerly the palace of Princess Amalie; some eighteen other theatres; Kroll's famous 'établissements' (1852) for 5000 visitors; the new circus, and the well-known Orphéum. The Thiergarten, in the W. of the city, is the chief public park, but there are also the garden of Bellevue, and the botanical garden of the Academy.

In education B. has long held the place of honour among Continental cities. Its institutions comprise (1873) 10 gymnasia, with 5333 scholars, 54 real and higher schools, 91 public and 96 private elementary and middle schools, 59 infant schools, asylums for the deaf, dumb, and blind, and numerous technical colleges. The B. university was founded in 1810, and in 1870 had 3500 students. It has gained a high reputation, having numbered among its professors such names as Fichte, Hegel, Schelling, Savigny, Neander, Bekker, Böckh, Buttman, Strauss, Mommsen, Virchow, and Ranke. The famous Science Academy of B. was founded in 1700, and the Academy of Art in 1699, the former being now allied with the new astronomical observatory. B. has also a celebrated military academy for officers, and several departmental military schools. The city is rich in charitable institutions, of which the principal is the medical hospital called La Charité, now incorporated with the Clinical Institute, and receiving on an average 10,000 patients yearly. There are also the Bethany Hospital, founded 1847, with accommodation for 350 persons; Hedwig's Hospital, established in 1852; also some sixteen other hospitals and houses for the convalescent, nine orphanages, twelve soup-kitchens, and two asylums for the homeless.

Despite its inland position, B. has become one of the leading commercial and industrial cities of Europe. Its communication with the sea has been improved by the construction of several canals (the latest in 1858); and it is now the great railway centre of N. Germany, having (1875) no fewer than seven railway stations. The leading industries are iron-casting (ten imperial foundries) and engine-building, which is almost entirely in the hands of Messrs Borsig, Egel, and Wöhlert, of European fame, who have here seventy-five works. There are also important manufactures of silks, woollens, cottons, ribbons, tapestry, paper, tobacco, sugar, leather goods, scientific and musical instruments, jewellery, and fancy ware. A large quantity of spirits is made, and there are over fourteen large breweries—*Weiss beer* being the favourite drink of the population. There are also here royal porcelain factories. The beautiful cast-ironwork of B. is called 'B.-jewellery.'

Not only in trade and industry, but in political life and intellectual progress, B. is eminently the metropolis of the empire. As the seat of government and the residence of the court, it attracts inhabitants from all parts of Europe, and it almost justifies the name given it by the proud Berliners, 'the Paris of the future,' if not in point of architectural grace, at least as a centre of fashion and of brilliant society. For many years its increase has been steady, and at the same time so rapid as to recall the sudden growth of an American 'lightning' city. From being a town of 20,000 inhabitants in 1688, it had increased to 188,000 in 1817; to 311,000 in 1840; to 436,000 in 1851; and to 524,945 in 1861. In August 1875, its population was 968,634, including 21,448 soldiers, and of this number there were 732,617 Protestants, 51,722 Catholics, and 36,015 Jews. In 1878 the total pop. was 1,034,854. The newspapers and journals of B. embraced in 1872 some 36 of an official, 46 of a political and social, 24 of an ecclesiastical and religious, 207 of an artistic, scientific, and commercial, and 18 of a comic character.

The oldest parts of the city are the divisions Köln and B., originally two fishing-villages, the first having risen to some im-

portance under the Markgraf Albrecht II. (1206-20). In 1442 the Elector Friedrich II. built his *burg* ('castle') on the site of the present royal palace, and under Johann 'Cicero,' towards the end of the 15th c. B. became the residence of the Hohenzollern princes. The town was improved, beautified, and enlarged by the great Elector Friedrich Wilhelm, and then by his son Friedrich II., afterwards Friedrich I., first King of Prussia. To Friedrich the Great, in the 18th c., is due its symmetry of plan and many of its finest ornaments. An Austro-Russian force occupied B. from the 9th to the 13th of October 1760. It was again taken by Napoleon in 1806, and acknowledged French supremacy till the failure of the expedition to Moscow in 1812. In the present century a new epoch in the architecture of B. has been marked by the genius of Schinkel, who has contributed so much to the stateliness and harmony of the modern city. See Spiker, *B. und seine Umgebungen im 19. Jahrh.* (Berl. 1833); Fidicin, *Geschichte der Stadt B.* (Berl. 1841); Streckluff, *B., seit 500 Jahren* (Berl. 1864); Kapp, *B. für Einheimische und Fremde* (Berl. 1869); *Betrachtungen über die Volksscala in B.* (1871); and *B. und seine Bauten* (2 vols. Berl. 1877).

Berlioz, Louis Hector, the leader of the romantic school of music in France, was born at La Côte-Saint-André (Isère), 11th December 1803, studied composition under Reicha, and later (1826) under Lesueur at the Paris Conservatoire, resided in Italy for eighteen months, became librarian of the Conservatoire in 1839, and a member of the Academy in 1856, and died at Paris, 9th March 1869. As a critic in the *Gazette Musicale de Paris* and the *Journal des Débats*, he exercised much influence. He was the composer of a number of orchestral works, as the *Overtures for the Carnaval Romain*, the *Corsaire*, the opera of *Bernabò Cellini*, and the *Flight into Egypt*, &c., in which he strove to express poetic ideas by musical sounds. In his attempts to do this he sometimes was led into extravagances which were rather the result of his ideas having outreached his capacity for executing them than of any extravagance in the ideas themselves. Besides these, he produced numerous symphonies. His books on the orchestra and on orchestration are very valuable, the principal being his *Traité d'Instrumentation et d'Orchestration Modernes* (1844). See B.'s *Mémoires* (Par. 1870; new ed. 1878).

Bermundsey, a parish in the county of Surrey, forming a S.E. suburb of London, possesses extensive tanworks, wool stores, and wharves. It also carries on shipbuilding, rope and sail making, and has manufactures of brushes, corks, glue, parchment, vellum, &c. Pop. (1871) 80,429. The name B., in Old Eng. *Burmundesea*, the 'Isle of Burmund' (perhaps *burh-mund*, the fortress?), points to a time when the Thames 'spread its sluggish waters over a broad lagoon, which was dotted with marshy islands.'

Bermudas, or Sommers's Isles, a group of small islands in the N. Atlantic, about 600 miles from Cape Hatteras in N. Carolina, in lat. 32° 20' N., long. 64° 50' W. They belong to Britain, and number in all about 300, only 15 or 16 of which, however, are inhabited; area of group about 12,000 acres; pop. (1871) 12,121, exclusive of the military and their families. They take the name B. from the Spaniard Bermudez, who first discovered them in 1527, and the name Sommers's Isles from Sir George Sommers, whose shipwreck here in 1609 led to their colonisation from Virginia four years later. They are 'the still-vest Bermoothes' of Shakespeare's *Tempest*, and their beauty has been celebrated by Waller in his *Battles of the Summer Islands*. Their situation renders them a valuable possession; they constitute a natural fortress; and their numerous bays afford ample protection to shipping. Hence they have been converted into the British naval station in W. Indian waters. Both politically and commercially their importance can scarcely be over-estimated, and towards the close of the first American war Washington contemplated their capture and conversion into a station for American men-of-war, with a view to cripple the British W. Indian trade. The four principal islands are those of Bermuda, St George's, Ireland, and Somerset. St George's Isle is the military station of the B.; its harbour has recently been greatly improved; a sandbank in front of it has been lowered by blasting, and an extensive breakwater has been built to protect it. The climate is genial and salubrious, and there is an almost perpetual spring. A refreshing sea-breeze modifies the heat, and the only climatic inconveniences are occasional hurricanes, and an excess of humidity during a S. wind.

The principal products are potatoes, garden-vegetables, maize, and tobacco. Fish are plentiful, and the fisheries constitute a valuable industry. Convicts are still conveyed to the B., and are employed on harbour work or on the fortifications. A mail steamer plies regularly between B. and Halifax, Nova Scotia. The islands have a representative constitution, there being a governor, a council of nine, and an assembly of thirty-six members. The military expenditure for 1872-73 was £196,273. The exports are few, and the imports consist chiefly of breadstuffs from the United States, and of manufactured goods from England. Hamilton, in Bermuda Island, is the capital. See *Memorials of the Discovery and Early Settlement of the B. or Somers Islands, 1515-1685*, by Major-General J. F. Lefroy (vol. i. Lond. 1877).

Bern, the second largest canton of Switzerland. Except a small portion on the N.W., where it touches France, B. is entirely surrounded by Swiss territory. In the N. and N.W. the canton is hilly; in the S. is the famous Bernese Oberland, some of whose summits (the Finsteraarhorn, the Schreckhorn, and Wetterhorn, and the Jungfrau) are the loftiest of the Bernese Alps. Enclosed by the mountains are beautiful and fertile valleys, Hasli, Grindelwald, Lauterbrunnen, &c., which produce corn, wine, and fruits. In these valleys, as well as on the more elevated Alpine pastures, numerous cattle are fed, and 150,000 cwts. of cheese are manufactured annually. The Aar and its tributaries rise in the Oberland, where also are situated Lakes Brienz and Thun. Watchmaking and wood-carving are the chief mechanical industries. The minerals are iron, lead, copper, marble, granite, and freestone. Area, 1870 sq. miles; pop. (1870) 506,465, of whom 436,304 were Protestants. On the decline of the Roman power, B. passed successively into the hands of the Alemanni, the Burgundians, and the Franks. In the 11th c. it became part of the German empire; at the end of the 12th c. Duke Berthold of Zähringen fortified the capital, which was in 1218 raised by the Emperor Friedrich II. to the rank of an imperial city, after which the population rapidly increased. Rudolf of Hapsburg was compelled to raise the siege of B. in 1288. The fame thus acquired was enhanced by the victory at Laupen, 21st June 1339, over an army of knights and burghers jealous of its growing power. After joining the Swiss Confederation (1353), B. increased its territory considerably both by purchase and conquest. It now sends 25 members to the National Council.

Bern (in French, *Berne*), capital of the canton of the same name in Switzerland, in 1848 declared to be the political capital of the republic, and since 1849 the permanent seat of the government. It is situated on a peninsula formed by the Aar, which encompasses it on three sides, and has an elevation of fully 1700 feet above the level of the sea. The city is regularly built, and the houses on each side of the two principal streets rest on arcades which form covered walks. There is a magnificent bridge over the Aar; the cathedral, founded in 1421, has a tower upwards of 200 feet in height, and numerous interesting sculptures and tablets; there are many fine public edifices, including a library containing 40,000 volumes, and a museum; while sculptured fountains and fine public promenades, which command splendid views of the Bernese Alps, enhance the amenity of the city and its environs. Other buildings are the church of the Holy Ghost, the church of the Dominicans, the Roman Catholic church, the mint, the palatial hospital, and the richly-endowed workhouse. The University of B., opened in 1834, has some 30 professors, 20 *privat-docenten*, and an average of 200 students. In May 1871 there were 250 students. There are also a gymnasium, a veterinary school, and a school of design. A school of art was founded in 1871. B. has considerable trade in the produce of the district, and there are frequent industrial and agricultural shows. The manufactures, which are of no great importance, include watches, clocks, mathematical instruments, toys, gunpowder, leather, and paper. Cotton-spinning has been recently introduced. Pop. (1870) 36,002, of whom 32,705 are Protestants, 2664 Catholics, and 853 belong to other Christian sects, or are Jews. B. is the old Suabian word for bear, and is said to have been given to the town at its foundation in 1191 by Berthold V., because he had killed a bear there. The arms of the city are bears, and some of these animals are still maintained by a special fund in the bear-ditch (*Bärengraben*). B. was made a free imperial city in May 1218 by the Emperor Frederick II. The corporation is possessed of so much valuable property that

no taxes are levied for municipal purposes, and there is a surplus sufficient to provide the citizens with fuel. B. is the birthplace of the eminent physiologist Haller, of whom there is a statue in the botanic garden. See Durheim's *Historisch-topogr. Beschreibung der Stadt B.* (Bern, 1859), and Wattenwyl's *Geschichte der Stadt und Landschaft B.* (Schaff. 1867).

Bernadotte. See KARL XIV.

Bernal'da, a town in the province of Potenza, S. Italy, on the Basente, 31 miles W. of Taranto, and 15 miles inland from the line of railway. Pop. about 6000.

Bernard, Claude, a French physiologist, was born at St Julien near Villefranche, July 12, 1813, in early life went to Paris with a tragedy, and there began the study of medicine. At the Collège de France he was Magendie's assistant; he took his doctor's diploma in 1843; was called to the chair of General Physiology, just then instituted by the Faculty of Sciences, in 1854; and in the same year succeeded Magendie as Professor of Experimental Physiology in the Collège de France. His reputation dates from his *Recherches sur les Usages du Pancréas*, in the *Comptes Rendus de l'Académie des Sciences* (1856), and perhaps his most original and valuable contribution to physiology is *La Fonction Glycogénique du Foie* (1856), which contains the results of many years' investigation of the liver and its relation to the heart and nerves. In his *Leçons de Physiologie Expérimentale, appliquée à la Médecine* (2 vols. 1855-56), he raised many forgotten questions as to the functions of animal organisation, and he has since given a new bent to the study of experimental physiology by his numerous discoveries. Among his other writings are *Mémoire sur la Chaleur Animale* (1856), *Les Effets des Substances Toxiques et Médicamenteuses* (1857), *La Physiologie du Système Nerveux* (2 vols. 1858), *Expériences Physiologiques sur la Nutrition et le Développement* (1860), *Introduction à l'Étude de la Médecine Expérimentale* (1865), *Leçons sur les Propriétés des Tissus Vivants* (1865). He was made a member of the Academy of Medicine in 1861, grand officer of the Legion of Honour in 1862, president of the Society of Biology in 1868, and member of the Academy in 1869. He died in Paris, February 10, 1878.

Bernard, Great Saint, a mountain of the Vallais, in the Pennine Alps, 12,353 feet high, crossed at an altitude of 8648 feet by the famous pass between Martigny and Aosta, over which Napoleon led his troops into Italy, May 1800. Near the summit of the pass stands the noble hospice which was founded by Bernard de Menthon, a nobleman of Savoy, in 962, originally for the purpose of assisting the pilgrims to Rome, and which has been of incalculable service in rescuing travellers from all forms of Alpine danger. It is a massive stone edifice, with extensive accommodation, receiving on an average 9000 travellers annually. There is snow here for nine months in the year; the mean winter temperature is 15° F., that of summer 48° F. The institution is now chiefly supported by voluntary subscription. It is in the care of fifteen monks of St Augustine, whose lives, from the age of twelve to thirty-three, are devoted to the humane work, in which they are ably seconded by the faithful race of St B. Dogs (q. v.).—**Little Saint B.** is a height of the Graian Alps, 7195 feet high, and has also a pass, most probably that crossed by Hannibal. There is another hospice here.

Bernard, Saint, the most influential churchman of the 12th c., was born in 1091 at the Château de Fontaine, near Dijon. His father, whose name was Tescelin, was descended from the Comtes de Châtillon; his mother, Aleth, or Elizabeth, was a daughter of the Comte de Montbard. Sent to Châtillon to study, he astonished his masters by the rapidity of his progress. At the age of twenty-two he resolved to embrace the monastic life, and so irresistible was the eloquence with which he urged his resolution against the remonstrances of his family and friends, that his five brothers, his uncle Gaudry, and more than twenty other proselytes, followed him to Cîteaux in 1114. Four abbeyes, daughters of Cîteaux, were all founded about this period: La Ferté in 1113, Pontigny in 1114, Morimond and Clairvaux in 1115. Clairvaux was a desolate and savage valley. Here the young Cistercians built with their own hands their first religious abodes. At the age of twenty-four B. was chosen abbot of the modest community. The rigour of his austerities proved too much for the strength of his constitution, and on his recovery from a serious illness, he began gradually to interest himself in the general policy of the Church. Before long the solitary recluse,

by his exquisite art, impassioned rhetoric, exalted piety, and strenuous orthodoxy, made himself one of the greatest potentates in Europe. In 1125 he was active in mitigating the miseries of a national famine; in 1128 he vehemently defended the Bishop of Paris and the Archbishop of Sens against Louis le Gros; was conspicuous in the same year at the Council of Troyes, where the order of Knights Templars was forced to accept a monastic rule, and again, in 1129, took part in the deposition of the Bishop of Verdun. The death of Pope Honorius II., in 1130, provoked a discord among the cardinals, which spread through the Church itself. Two popes were chosen as his successor, Innocent II. and Anaclete, the former of whom had to seek refuge in France, while the latter remained in Rome, where his party was dominant. The great prelates and seigneurs assembled at Étampes declared (under the direction of B.) in favour of Innocent. Louis le Gros received him as head of the Church at Saint-Benoît-sur-Loire, while B. hastened to Normandy and Liège to secure the support of the English monarch and the German emperor. In both journeys he was more than successful. In 1131 B. paid his first visit to Italy. Pisa, Genoa, Milan, vied with each other in the depth of their homage and the splendour of their offers. The austere saint, who was equally proud of his power and his poverty, refused all ecclesiastical honours, but he could not hinder his return to Clairvaux from assuming the character of a triumphal procession. As he marched over the Alps into the valleys of Burgundy, the peasants of the mountain-villages and the inhabitants of the cities poured forth to 'do him reverence.' But active work was indispensable to B. While a larger monastery was being built for the reception of his disciples, he travelled through the S.-W. of France in company with Geoffroi, Bishop of Chartres and legate of the Holy See, detached Guillaume Duc d'Aquitaine from the party of Anaclete, and secured the re-establishment in their sees of those bishops who had been expelled for their fidelity to the legitimate pope. In 1137 B. was again summoned to Italy to sustain the still uncertain cause of Innocent. Once more his eloquence proved victorious. The Pisan cardinal, who was one of the warmest partisans of Anaclete, yielded to the ascendancy of B.'s genius, and denied the anti-pope, who soon after died of chagrin. It was in vain that the schismatics elected another in the room of Anaclete. The new anti-pope felt his impotence, hastened to the presence of the saint, and left in his hands the insignia of office. On his return to France B. came into collision with one whose gifts were certainly not less than his own. Abelard (q. v.), the tender humanist, who 'loved not wisely but too well,' had incurred the charge of heresy by his vindication of the rights of reason. A council was held in 1140, and by the influence of B. Abelard was condemned without even being heard. It is the least noble incident in B.'s career. But time brings about its revenges. The faulty Abelard is still remembered with affectionate pity by mankind, while the immaculate saint whose fame once filled the world only maintains a cold existence in the page of history. In 1145, a pupil of Clairvaux was chosen pope, under the name of Eugenius III., and henceforth B. exercised sovereign power in the Church. 'They say,' he wrote to Eugenius, 'that I am more pope than you.' Meanwhile an embassy of Christians from Armenia came to the court of Rome to explain the miserable state of the Eastern Churches. The Saracens, masters of Edessa, threatened Antioch and Jerusalem. Another crusade was necessary. Louis VII. of France undertook to lead it. Conrad of Germany joined him. All the resources of B.'s eloquence were employed to inflame the religious enthusiasm of the two nations. In 1147, an innumerable host marched to the East, and was utterly destroyed in the defiles of Asia Minor. When news of the disaster reached Europe, in 1149, B. suffered severe reproaches, and it may be doubted if he ever felt the same man again. But he was energetic to the end. His last act at least was apostolical. At the request of the Archbishop of Trèves, he went to Lorraine to appease the quarrels between the burghers and the nobles. Soon after his return to Clairvaux, he died, 20th August 1153. B. was canonised by Pope Alexander III. in 1174. His labours as a churchman may be conceived when we state that he caused to be founded or enlarged 72 monasteries—viz., 35 in France, 11 in Spain, 10 in Britain, 6 in Flanders, 4 in Italy, 2 in Germany, 2 in Sweden, 1 in Hungary, and 1 in Denmark. His writings are numerous. They consist of 440 epistles, 340 sermons, and 12 theological and moral treatises. They are admirable in passages, full of grace and natural dignity, but they do

not bear out his reputation for oratory; his ideas are often subtle without being profound, and his mystical interpretations of Scripture are unfitted to secure the respect of the modern world. The best edition is that of Mabillon (2 vols. Par. 1690, latest ed. 1839-40). During the last three centuries numerous lives of B. have been composed, among which may be mentioned, Chieré, *Vie de S. B.* (Par. 1601); Gros, *Vita S. Bernardi* (Par. 1645); Gulielmus a Sancto Theodorico, *Vita S. Bernardi* (Par. 1690); Bourgoing de Villefore, *Vie de S. B.* (Par. 1704); Clemencet, *Histoire Littéraire de S. B. et de Pierre le Vénérable* (Par. 1774); Neander, *Der Heilige Bernhard und sein Zeitalter* (Berl. 1813); and Ellendorf, *Der Heilige Bernhard und die Hierarchie seiner Zeit* (Essen. 1837).

Bernard Dog, St., a breed of dogs deriving their name from the Hospice of St B., where they have long been bred and trained for the purpose of seeking out travellers who are in danger of perishing in the snow. These dogs have been variously described as arising by breeding from the Alpine shepherd's dogs, from a Spanish breed, and from Danish hounds. Two breeds are known—one of a white colour, spotted with black, and covered by rough hair; the other with smooth, close hair, of grey or blackish colour. The latter breed is the most valued, and furnishes by far the greater number of these dogs in the present day. The head is massive, and the ears long, like those of spaniels. These dogs possess a remarkably acute scent, and when they discover a benumbed traveller they scratch away the snow, and by barking, call attention to the spot. A flask of brandy or other spirit is hung round the neck of each dog. Very many remarkable achievements, in which a display of instinct approaching to reason in its nature has been exerted, are related as having been performed by these dogs.

Bernardin, Saint, of Siena, an Italian theologian and preacher, was born at Massa-Carrara, 8th September 1380. He belonged to the illustrious Sienese family of Albizzeschi. B. first distinguished himself by his zeal and courage during the destructive Italian plague of 1400. In 1404 he withdrew into solitude, joined the Franciscans, was sent to the Holy Land, and on his return preached with success for fourteen years, refusing repeatedly the offer of a bishopric. In 1438 he was appointed vicar-general of the order for Italy. At his death in 1444 the 'Fratres de Observantia,' an order of which he was the founder, possessed upwards of 300 monasteries. B. was canonised in 1450, his festival being on the 20th of May. His works were published at Venice in 1591, at Paris in 1636, and again at Venice in 1745.

Bernardines. See CISTERCIANS.

Bernay (the Roman *Bernauium*), a town in the French department of Eure, on the Charentonne, 43 miles W. by N. of Evreux. It has manufactures of woollens, linens, paper, &c., also tanneries, and is noted for its great annual horse-fair. B. has an abbey of the year 1000, reconstructed in the 17th c., and now serving as the *Hôtel de Ville*. The town is often mentioned in works of the middle ages. Pop. (1872) 5695.

Bernburg, a town in the duchy of Anhalt, Germany, on the river Saale, 85 miles S.W. of Berlin, with which it is connected by railway. It has a castle situated on a steep sandstone rock, and its chief manufactures are paper, porcelain, starch, spirits, sugar, and tin-ware. There is also some trade in agricultural produce, and in fruit. Pop. (1875) 16,929, including the suburb of Waldau.

Bernhard, Duke of Weimar, a famous German general in the Thirty Years' War, was the youngest son of Johann III., Duke of Saxe-Weimar, and was born 6th August 1604. He first distinguished himself, under the Markgraf of Baden, at the battle of Wimpfen in 1622; in the year following at Stadtlonn, under Christian of Brunswick; and subsequently in the Dutch service, then the best military school in Europe. He next took service under Christian IV. of Denmark, but returned to Weimar in 1628. In 1631 he joined Gustavus Adolphus against the Imperialists, signalled himself at Werben (28th July 1631), and at the storming of Marienberg; conquered Mannheim at the close of 1631, and several other towns early in 1632. He completed the victory of Lützen (6th November 1632) after the fall of Gustavus, and expelled the Imperialists from Saxony. B.'s subsequent career is crowded with vallant deeds, and he sustained

in a high degree the reputation of the Germans for military prowess. In 1633 Bamberg, Kronach, Höchstädt and Eichstätt, and Regensburg (the key of the Danube), fell into his hands. His defeat at Nördlingen (27th August 1634) paralysed him for a time, and forced him to seek a French alliance, which he concluded with Richelieu 17th October 1635. In 1636 he conquered Elsass-Zabern, in 1637 was victorious over Duke Karl of Lorraine, in 1638 captured Seckingen, Lauffenburg, and Waldshut, and was victorious at Rheinfelden and other places. In the midst of his triumphs he was cut off at Neuberg on the Rhine, 8th July 1639, not without a suspicion of his having been poisoned at the instigation of France, who began to see that B. was a thorough German, who wanted to strengthen and unify his country. See Röse, *Herrzog B. der Grosse, von Sachsen-Weimar* (2 vols. Weim. 1828-29).

Ber'ni, Francesco, an Italian comic poet, after whom Italian burlesque poetry has been named *Versi Berneschi*, or *Poesia Bernesca*, was born at Lamporecchio, in Tuscany, about 1490. After acting for seven years as secretary to Ghiberti, Bishop of Verona, he repaired to Florence, where he was made a canon, and died there, 26th July 1536. His *Opere Burlesche* (2 vols. Flor. 1548) were republished in London, in 2 vols. (1721-24), with notes by Salvini, and are reprinted in the *Classici Italiani* (Mil. 1866). His recast of Boiardo's *Orlando Innamorato* is preferred by his countrymen to the original. It has been frequently reprinted. A critical edition by Molini and Valariani appeared at Florence in 2 vols. (1827-28). For purity of diction and breadth of humour, B. has few equals.

Ber'nier, François, a French physician and traveller, was born at Angers about 1620, studied at Montpellier, and subsequently visited Syria, Egypt, Arabia, and India, where he resided twelve years, eight of which he was physician to Aurungzebe. His chief works are, *Voyages de M. B., contenant la Description des États du Grand Mogol, &c.* (begun in 1670, published as one work, Amst. 1699); *Mémoire sur le Quétisme des Indes* (1688); *Sentiment de M. Descartes* (1684); *Abrégé de la Philosophie de Gassendi* (Lyon, 8 vols. 1678, augmented by 7 vols. 1684). B. (the *joli philosophe* of St Evremond) died at Paris, September 22, 1688.

Berni'na, a peak of the Rhaetian division of the Middle Alps, attains a height of 13,291 feet, with a glacier on its northern slope almost rivalling the Mer de Glace in size. To the W. of the mountain is the B. Pass (7655 feet high), over which a carriage-road leads past two small lakes, between which lies the watershed of the Inn and Adda basins.

Berni'ni, Giovanni Lorenzo, sculptor, architect, and painter, spoken of among his contemporaries as the *Cavalier B.*, and the modern *Michael Angelo*, the most fortunate of all artists in securing, during his lifetime, the amplest admiration and rewards, was born at Naples, 1598. When only eighteen he exhibited his 'Apollo and Daphne,' and became famous. Pope Urban VIII. employed him to execute the baldacchino of St Peter's, and his chief architectural work is the colossal colonnade in front of the entrance. He also decorated the pillars sustaining the dome with statues and niches, and when cracks showed themselves in the cupolas, his enemies laid them to his account. His answer to this slur upon his architectural knowledge was building the Barberini Palace with its magnificent spiral staircase. In 1665 he went to Paris on the invitation of Louis XIV., travelling with the retinue and circumstance of a prince. At Paris B. executed the bust of the king and other works, and won much honour and more wealth. He returned laden with gifts to Rome, and died there, November 28, 1680, worth about £100,000.

Bernoulli, a celebrated family of mathematicians in the 17th and 18th centuries. They were descended from a **Jakob B.**, originally of Antwerp, who was forced by the oppression of the Duke of Alva to take refuge in France, where he died in 1583. A grandson of Jakob, bearing the same name, settled at Basel in 1622, and died there in 1634. The B. family here attained a high position in the little state, and held various important public offices.—**Nikolaus**, eldest son of the Jakob who died in 1634, was a prosperous merchant, and became a member of the great council of the city. He died in 1708, leaving eleven children, of whom the fifth and the tenth were the most famous.—**Jakob B.**,

fifth son of Nikolaus, was born December 27, 1654, at Basel, where he subsequently became professor of mathematics. He greatly extended the discoveries of Leibnitz, and was the founder of the integral calculus. He died August 16, 1705. His works were published in a collected form at Geneva in 2 vols. 1744.—**Johann**, tenth son, who succeeded his brother at Basel, was born July 27, 1667, and died January 1, 1748. His works were also published in a collected form at London and Geneva in 1744. The brothers were unquestionably the greatest pure mathematicians of the age, and had pushed their investigations so far as to outstrip even Leibnitz.—**Nikolaus B.**, the eldest son of the last, was born January 27, 1695; but had just time to show that he possessed the talents of his family when he died at St Petersburg, July 26, 1726.—**Daniel B.**, brother of the last (born February 9, 1700, died March 17, 1782), was the first to decompose motion of any kind into that of rotation and translation, and to investigate fluid motion solely from mathematical considerations. His works are numerous, treating of a great variety of subjects—vibration, sound, navigation, *vis viva*, &c.—**Johann B.** (born May 8, 1710, died July 17, 1790), brother of Daniel, and his two sons, **Johann** and **Jakob**, had also great mathematical talents, and their memoirs are to be found in the scientific publications of that period.—**Nikolaus B.**, (born 1687, died 1759), a nephew of the two first Bernoullis, was professor of mathematics and law at Padua, and some of his writings are found amongst those of Johann, his uncle. He is best known for his investigations into the conditions of integrability of differential expressions.

Bern'stein, Georg Heinrich, a German orientalist, born 12th January 1787, at Kospeda, near Jena, at the university of which he studied theology, philosophy, and the languages of the East. In 1812 he was appointed professor-extraordinary of oriental languages at Berlin, regular professor in 1821, and called to a chair at Breslau in 1843. In 1816 he published at Leipsic an Arabic poem of Szafi-Eddin, and he made valuable contributions to Syriac lexicography in Kirsch's *Chrestomathia Syriaca* (2 vols. Leips. 1832-37). The materials for his contributions to Syriac lexicography were collected at Leyden, Oxford, and Cambridge. Other works of B.'s are, *De Initio et Originibus Religionum in Oriente dispersarum* (Berl. 1817), the *Histopadesa* (Leips. 1823), and *Arabische Grammatik und Chrestomathie* (Gött. 1817). He died 7th April 1860.

Bero'ë. A genus of Cœlenterate animals, included in the highest order of that sub-kingdom, the order *Ctenophora*. The body is spherical or globular in shape, and consists of a clear gelatinous mass, provided externally with *ctenophores* or comb-like bands or masses of *cilia*, by means of which locomotion is subserved. These *ctenophores* are disposed meridionally around the body. A digestive system, consisting of a stomach-sac and a series of canals, exists; the function of the latter being to distribute the nutritive products throughout the body. The genus B. is different from *Cydippe* or *Pleurobrachia*, which possess two tentacles. *B. fulgens* (so named from its phosphorescent light), *B. cucumis* and *B. borealis* are familiar species.

Bero'sus, a priest at Babylon in the reign of Antiochus II. (B.C. 261-246), who wrote in Greek a history of Babylonia, only fragments of which are extant in Josephus, Eusebius, Syncellus, and the Christian Fathers. He states that the materials for his work were derived from the archives in the Temple of Belus, and recent discoveries have proved the accuracy of his statement. See Richter's *Berosi Chaldaeorum Historia quæ supersunt* (Leips. 1825).

Berre, Etang de, a lagoon in the department Bouches-du-Rhône, France, 12 miles long and 8 broad, lies about 10 miles N.W. of Marseille, and is connected by a short channel with the sea. It has extensive saltworks, and on its N. shore stands the town of B., with some trade in salt, olive oil, almonds, and figs, and a pop. (1872) of 1358.

Berry, a term applied to the fruit of various plants. It is properly a fruit with one or more locuments, generally many-seeded, indehiscent, and pulpy. The attachment of the seeds to the placenta is lost at maturity, and they are scattered in the substance of the pulp. The gooseberry, the whortleberry, the fruit of the vine, &c., are examples. The term *uva* (applied specially to the fruit of the vine) is synonymous and unnecessary. Brown's *Manual*, p. 491.

Berry, or **Berri**, one of the old midland French provinces (now forming the departments of Indre and Cher). It took its name from the Gallic *Bituriges*. Under the Frankish counts it became a hereditary fief; viscounts ruled it from 917 to 1100; later it was purchased by Philippe I. of France. It was often an appanage of, and has given a title to, the French princes; was raised to a duchy in 1360, and was several times—e.g. in 1465—united with the crown. The inhabitants are called *Berrichons* or *Beruyers*.

Berry, Charles Ferdinand, Duc de, second son of Charles X., born 24th January 1778, 'emigrated' with his father, and fought under Condé against the republican army at Thionville. After the peace of Leoben he retired to Nursia, and latterly to England. In 1814 he returned to France, and in 1816 married Caroline, eldest daughter of Francisco, afterwards King of the Two Sicilies. The Duke was murdered by Louvel, 13th February 1820. His posthumous son, Henri, Duc de Bordeaux, Comte de Chambord, has frequently proclaimed himself Henri V., and is the hope of the Legitimists, or Bourbon party, his uncle, Duc d'Angoulême, eldest son of Charles X., having died in 1844 without issue. Mme. la Duchesse de Berri, who was the great ornament of Louis XVIII.'s court, and behaved nobly in the revolution of 1830, excited a foolish insurrection in La Vendée in 1832, which was promptly suppressed, the Duchess being confined for some time at Blaye. See Chateaubriand's *Mémoires du Duc de B.* (Par. 1820), and Alissan de Chazet's *Éloge historique du Duc de B.* (Par. 1820).

Berryer, Pierre Antoine (son of Pierre Nicolas B., one of the 'hommes de loi' of the first republic, and the defender of Marshal Ney) was born at Paris, 4th January 1790. Educated at Juilly, he joined the bar in 1811. A Legitimist in politics, he made his reputation in defending Generals Cambronne and Daballe, the newspapers *Drapeau Blanc* and *La Quotidienne*, and the Abbé de la Mennais against government prosecutions. Elected deputy for Puy in 1829, he opposed the address of the 221, which precipitated the revolution of July, supported the hereditary peerage, and in 1832 was suspected (unjustly) of complicity in the Vendean demonstration of the Duchess of Berry. In 1842 he sat for Marseilles, and in 1848 became a member of the council of President Bonaparte, but protested against the *coup d'état*. He became *bâtonnier* of the bar in 1852, and died 29th November 1868. In spite of his Legitimist principles (shown in his two pilgrimages to the Comte de Chambord) he supported the right of free association, and the reduction of the journal duty, and defended Louis Napoleon for the Boulogne expedition, and De Montalembert for an alleged libel in the *Correspondant*. In 1868 he defended the independence of the bench in the debate on the new press-law. He assisted in the revision of the code of 1814. It has been said that in B. Mirabeau revived. His name is also known in the struggle between the independence of the bar and the influence of the 'ministère public.'

Bersaglieri, the name given to a corps of Italian sharpshooters, which was organised early in the reign of the present king of Italy by General Della Marmora. They first obtained a reputation in the Crimean war (Sardinia being one of the Allies that fought against Russia), distinguishing themselves by their dash and bravery at the battle of Tchernaya. They were also of the greatest service in the wars which resulted in the unification of Italy, and from their activity have been much employed in putting down brigandage in the Two Sicilies, although complete success has not yet crowned all their efforts.

Ber-serk'er (Icel. *ber*, 'bare,' and *serker*, 'shirt'; Low Sc. 'sark,' of mail), according to the Norse myth, was the grandson of the eight-handed Starkader and of the beautiful Alfhilde. B. was the dreaded hero of battle; he fought without mail or helmet, protected only by the terror which his fury inspired. His twelve sons shared the paternal rage for conflict.

Bertall, Charles Albert d'Arnoux, a French caricaturist, was born in Paris, December 18, 1820. It was intended by his parents that he should receive the training of the École Polytechnique, but at an early age he abandoned himself to the study of art, and became the pupil of Drolling, and the protégé of Balzac. The author of *La Comédie Humaine* suggested his pseudonym of B., a kind of anagram of Albert, and frequently provided his ready pencil with subjects. B. first ap-

peared as a designer on wood in 1843, and latterly devoted himself exclusively to this branch of art, having since shown marvellous rapidity of production and an inexhaustible fancy. He contributed 3600 drawings to the *Romans Populaires Illustrés*, and among his principal works are *Les Omnibus*, a comic review; *Le Diable à Paris*; *Petites Misères de la Vie Conjugale*; *La Physiologie du Gout*; *Paris en l'An 3000*; *Bibliothèque des Enfants*; besides numberless illustrations in the *Journal pour Rire*, *La Semaine*, *L'Illustration*, &c. In 1874 appeared *La Comédie de Notre Temps*, perhaps his cleverest work, in which the artist most effectively exposes the shams and abuses of modern society. While B.'s drawings are often finished and delicate, his crudest sketch exhibits a vigorous touch, and the stamp of a sarcastic originality.

Berth, or **Birth**, is a nautical term, describing the space occupied by a ship at anchor, including a small width of water all around her; the messing or sleeping-room of a sailor; and also the crib allotted to third-class passengers in ships.

Bertha (Old Ger. *Berchta*, q. v.), is the name of several noble ladies of the Teutonic race in early times. Two may be noted:—1. **St B.**, daughter of Charibert, King of the Franks, who, in A.D. 560, married Æthelberht, King of Kent, was the means of his conversion to Christianity, and the consequent spread of the gospel among the English conquerors of Britain.—2. **B.**, a housewife of renown, represented on seals and monuments of her time as sitting on the throne spinning, was daughter of Burkhard, Duke of the Alemanni, wife of Rudolf II., King of Burgundy beyond the Jura, and after his death regent for her infant son Konrad. She subsequently married Hugo, King of Italy, and died towards the end of the 10th c.

Berthier, Louis Alexandre, Prince of Neufchatel and Wagram, Marshal, born at Versailles, 20th November 1753, entered the French army, and served under La Fayette in his American campaign against Cornwallis. After the Revolution he became major-general of the National Guard of Versailles, a general of division in the Italian army of 1795-96, and subsequently chief of the staff, in which capacity he accompanied Napoleon in all his campaigns down to 1814, riding with him in the carriage, taking notes of instructions. He gave important help in establishing the Consulate, and became Minister of War (*vice De Crancy*) in 1799. When Talleyrand and Fouché also took office, under the senatus-consulte of 1804, B. became grand huntsman. He organised the government of Piedmont. His activity at Lobau and Wagram procured him one of his honours. In 1810 he was Napoleon's proxy at his marriage with Maria Louisa. In 1814 he presented the French marshals to Louis XVIII. at Compiègne, and was made a peer and captain of the guards. Remorse at his desertion of the Emperor caused him to commit suicide at Bamberg on 1st July 1815. He has left *Relation des Campagnes du Général Bonaparte en Égypte et en Syrie* (Par. 1800), and *Relation de la Bataille de Marengo* (Par. 1806). His *Mémoires* were published in 1826.

Berthlotia (*B. lanceolata* or *indica*), a genus of Composite plants, natives of India and Senegambia, the leaves of which are astringent, and used as substitutes for senna.

Bertholl'et, Claude Louis, Comte de, a celebrated French chemist, was born at Tailloire, in Savoy, 9th November 1748. He graduated as doctor of medicine at Turin in 1768, but removed in 1772 to Paris, where he became in 1794 a professor in the Normal School. Two years later he was entrusted with the transportation of artistic masterpieces from Italy to France, accompanied Napoleon, who subsequently made him a count and a grand officer of the Legion of Honour, to Egypt, where he accomplished valuable scientific work, and, after the restoration, was nominated a peer by Louis XVIII. B. died at Arcueil, near Paris, November 6, 1822. Of his numerous discoveries and improvements, we may specially mention his discovery of the composition of ammonia, his proposal for using chlorine as a bleaching agent, his means for purifying saltpetre for gunpowder manufacture, and his methods of smelting iron and converting it into steel. His most important works are his *Éléments de l'Art de la Teinture* (1791), his *Méthode de Nomenclature Chimique* (1787), and his *Essai de Statistique Chimique* (1803).

Bertholletia. See BRAZIL NUTS.

Berlin, Louis François, founder of the influential French journal the *Journal des Débats*, was born in Paris, December 14, 1766. He took to writing for the press in 1793, and in 1799 founded the journal with which his name will always be associated. It was originally royalist in principles, and in consequence both it and its editor were subjected to much annoyance during the days of the first empire, B. being on one occasion banished to Elba. After the fall of Bonaparte, the *Débats* became a liberal monarchical journal, independent, however, of government. B. continued to edit it till his death, 13th September 1841.—**Louis Marie Armand B.**, son of the preceding, was born in Paris in 1801, and succeeded his father in the editorship of the *Débats*, to which he had contributed from an early age. He died January 11, 1854. Both father and son were intimate with Chateaubriand, and the latter acted as his secretary when he was ambassador to England.

Bertino'ro, a town in the province of Forlì, N. Italy, and a station on the railway, near the river Ronco, 40 miles S.E. of Bologna. It is the see of a bishop, was formerly a fief of the Malatesta family, and has a cathedral and various convents and churches. Pop. 6388.

Bertrand, Henri Gratien, Count, born at Chateauroux (Indre), 28th March 1773, joined the National Guard in 1792, and served as an engineer under Napoleon in Egypt, where he became a general of brigade. At Austerlitz, Friedland, Aspern, Wagram, and in the Russian campaign he distinguished himself. Napoleon made him adjutant, and also Count of Illiria. B. decided the battle of Lützen, and covered the retreat from Leipsic. He remained with the Emperor at Elba, Waterloo, and St Helena, and in 1830, the sentence of death against him having been cancelled by Charles X., he returned to France, where he became a deputy, and commandant of the Polytechnic School. B. died 31st January 1844. After his death his sons published the *Campagnes d'Égypte et de Syrie, Mémoires pour servir à l'histoire de Napoléon, dictés par lui-même à Saint Hélène au Général B.* (Par. 2 vols. 1847).

Ber'vic, or Bal'vay, Charles Clément, an eminent engraver, born at Paris, 23d May 1756. The sole incidents in his career are the records of his artistic work. After some less successful efforts, he established his reputation in 1790 by his full-length engraving of Louis XVI., after Callet's portrait. His masterpiece, however, is his engraving of the Laocöon. B. died 23d March 1822. The correctness of his drawing, and the clearness and brilliancy of his manipulation, give his works a high value.

Berwick, James Fitz-James, Duke of, natural son of James II. of England, by Arabella Churchill, sister of the Duke of Marlborough, was born 21st August 1670. He made his first campaign in Hungary, under Karl of Lorraine. In 1689 he accompanied his father to Ireland, in his expedition against William of Orange, and was severely wounded. In 1692 he entered the French service, and fought under Marshals Luxembourg and Villeroi. In 1704 he commanded the French army in Spain, whence he set out to crush the Camisards, or Waldenses, in the S.E. of France, who were heroically struggling for liberty of conscience. In 1705 he took the place of Feuillade at the head of the French troops in Savoy, and conquered Nice, 4th January 1706. For this he was created a marshal of France. In 1707 he was again sent to Spain, where he gained the famous victory of Almanza, which re-established the rule of Philip V., who made him Duke of Liria and Xerica. From this date till 1719 he distinguished himself in Spain, Flanders, and France. In fact, he finished the war of the Spanish Succession by the capture of Barcelona, 11th September 1714. In 1733, after a protracted period of inactivity, he took the command of an army that was to cross the Rhine, and was killed by a cannon-shot at the siege of Philippsburg, 12th June 1734. His military capacity was undoubted, and his defence of Dauphiné was a strategic triumph. French critics place him on a level with Catinat and Villars. His *Mémoires*, in 2 vols. 8vo, were published in 1778 by his grandson, after having been revised by the Abbé Hook.

Berwick, North, a watering-place and seaport at the mouth of the Firth of Forth, in Haddingtonshire, 22 miles E.N.E. of Edinburgh by railway. It lies on a fine bay, has many hand-

some villas, splendid golfing links (recently much enlarged), and spacious hotels. Along with Haddington, Dunbar, Jedburgh, and Lauder, B. returns a member to Parliament. Pop. (1871) burgh 881, parish 2373. The most interesting objects in the parish are the Bass Rock, Tantallon Castle, and N. B. Law, a conspicuous cone-shaped hill, 940 feet high.

Berwick-on-Tweed, a seaport at the mouth of the Tweed, 58 miles S.S.E. of Edinburgh, constitutes, with its liberties, a county of itself, belonging neither to England nor Scotland, and in Acts affecting the United Kingdom is introduced separately as 'the good town of B.-upon-T.' But in the census and other parliamentary returns it is treated as belonging to Northumberland. Its origin is ascribed to the Anglian kings of Northumbria, but there are no authentic records before the reign of Alexander I., when it was an important seaport. For centuries it was an object of contention between the English and the Scots, but was finally ceded to Edward IV. in 1482. In 1551 it was erected into a free town, independent of both countries; but its importance as a frontier-town ceased when James VI. succeeded to the English crown. B. is pleasantly situated on the N. bank of the Tweed. The old fortifications partly remain. A stone bridge of fifteen arches, completed about 1634, and the North-Eastern Railway bridge, connect B. with Tweedmouth on the S. side of the river. Principal industry, fishing, and there is an inconsiderable shipping trade, the imports being timber, manures, and iron, and the exports salmon, corn, and coals. Pop. (1871) 13,282.

Berwickshire, the most eastern border-county of Scotland, in the basin of the Tweed, bounded N. by Haddington, S. and S.E. by Roxburgh and Northumberland, E. by the North Sea and Berwick-on-Tweed, and W. by Roxburgh and Midlothian. Area, 464 sq. miles; pop. (1871) 36,486. In the N. are the Lammermoors, where the surface is generally hilly and barren, but the districts of the Merse in the S., and Lauderdale in the W., are as productive as any part of Scotland. Agriculture is in a very advanced state, and the principal crops are wheat and oats. The geological formation of B. is silurian in the N., Devonian in the W., and carboniferous limestone in the S.E., the only minerals being coal and ironstone. The coast-line, stretching fr. Lamberton to St Abb's Head, a distance of over 9 miles, is precipitous, and has only two bays, Coldingham and Edgemouth. Coldingham Priory, Dryburgh Abbey, Hume Castle, Fast Castle, and some remains of Roman camps and British barrows, are the chief objects of interest. The county town is Greenlaw, but it is surpassed in importance by Dunse. Under the jurisdiction of school-boards there are 46 day-schools, with 4500 pupils, while there are also 30 private schools, attended by some 2000. B. returns one member to Parliament.

Ber'y, a mineral closely allied to the emerald, from which it only differs in the absence of the rich green colour which characterises the precious emerald. The colour of the B. varies, in some cases it being almost colourless and transparent, while other varieties possess various shades of light blue, green, or greenish yellow. The clearer pale tints of blue and green are known as aquamarines or precious beryls. The B. crystallises in regular six-sided prisms, and some specimens of great size exist, one found in New Hampshire, U.S., weighing 2900 lbs.

Berzelius, Johan Jacob, Friherre af, was born at Westerlösa, near Linköping, in East Gothland, Sweden, 29th August 1779, studied medicine at the University of Upsala, but soon devoted himself almost exclusively to chemistry. After holding some minor offices, he was appointed, in 1807, Professor of Medicine and Pharmacy at Stockholm. In the same year he took part in founding the Swedish Society of Physicians; in 1808 was chosen a member, in 1810 president, and in 1818 perpetual secretary of the Academy of Sciences, Stockholm. Raised to the rank of a noble in the last of these years by King Karl Johan, B. took some part in parliamentary affairs, but the whole energy of his genius was really given to the service of science. The result was something approaching a revolution in chemistry. Its whole present form rests in a measure on the discoveries and views of B., although the rapid advances of the science has detected errors and imperfections in his work. He discovered the elements selenium and thorium, and was the first to exhibit, in the metallic form, calcium, barium, and strontium, and to isolate silicon and zirconium.

He gave a new, or, at least, a completely different nomenclature and classification of chemical combinations, which has since been universally accepted, and engaged in laborious analytical researches to confirm and extend the atomic theory. His electrochemical theories and experiments are also of great importance. B.'s chief works are *Afhandlingar i Fysik, Kemi och Mineralogio* (6 vols. Stockh. 1806-18), the *Foreläsningar i Djurkemien* (2 vols. Stockh. 1806-8), and the *Öfversigt om Djurkemien Framsteg* (Stockh. 1812). But his great work is his *Lärobok i Kemien* (3 vols. Stockh. 1808-18, 2d ed. 1817-30), which has been translated into French by Jourdan, with improvements and additions by the author (Par. 1829), into German by Blöde, Palmstedt, and Wöhler (4 vols. Dresd. and Leips. 1825-31, 5th ed. 10 vols. 1843-47), into English, and also into Dutch, Italian, and other languages. As secretary of the Academy of Sciences, he published yearly the *Arbetsättelser om Framstegen i Fysik och Kemi* (Stockh. 1820-47). B. died 7th August 1848.

Besançon, formerly the capital of Franche-Comté, now of the department of Doubs, France, on the river Doubs, 45 miles E. of Dijon, a very old and strongly fortified town. It is well-built, the most remarkable edifices being the cathedral, the palace, built by Cardinal Granvella, and the public library, containing 80,000 volumes and some valuable manuscripts. The chief manufactures are of watches, hosiery, carpets, agricultural implements, iron and copper wares, porcelain, liqueurs, and beer; and there is a considerable trade in wine, brandy, iron, and coal. Pop. (1872) 33,158. B. is the *Vesontio*, *Besontium*, or *Visontium* of the Romans, was in existence in Cæsar's time, and has had an unbroken municipal existence since the 1st c. Along with Franche Comté, it was annexed to the German empire in the 12th c. The Emperor Friedrich I. held a diet here from 1062 to 1178, and made it a free imperial city. Cardinal Granvella, minister of the Emperor Karl V., who, as archbishop of B., was a German prince, founded here a university which lasted to the French Revolution. It first became a French town in 1679. B. has numerous memorials of its Roman period.

Bessants, or **Bezants**, Byzantine gold coins, of varying weight and value, introduced by the Crusaders into England, where they were current from the 10th c. till the time of Edward III. There were also silver B.

Bessara'bia, a southern frontier government of Russia, lying between the Dniester, the Danube, and the Black Sea, and bounded on the W. by Moldavia. It belonged to Turkey from 1484 till 1812, when it was ceded to Russia by the treaty of Bucharest. As one of the results of the Crimean war, about 1000 sq. miles of B. were restored to the Porte in 1856, but were recovered by Russia at the close of the Russo-Turkish War of 1877. The country is traversed in the N. by spurs of the Carpathian mountains, and in the S. forms a vast steppe, where the soil is rich but poorly cultivated, yielding wheat, barley, millet, and some hemp, flax, tobacco, fruit, and wine. Cattle and sheep are reared in large numbers, and much salt is procured from the lakes. Kischinev is the capital. Area, 13,472 sq. miles; pop. 1,026,346.

Bessar'ion, Joannes, born at Trebizond in 1389 (according to Michael Apostolios), or in 1395 (according to Bandini), entered the order of St Basil, and spent twenty-one years in a monastery in the Peloponnesus. He was made Bishop of Nicæa by the Greek Emperor Joannes Palæologus, whom he accompanied to the Council of Ferrara (1438), and at first eloquently maintained the doctrines of the Greek Church; but being gained over to the Latin side, he was ultimately the principal cause of the union agreed on. He soon after joined the Latin communion, was made a bishop, a cardinal, papal legate at Bologna, and was twice near being made pope. On his death at Ravenna, November 9, 1472, B. left his library, consisting of 600 Gr. MSS., to the city of Venice. B. is perhaps most famous for his attempt to reunite the Eastern and Western Churches, but this liberal policy was only a consequence of his free study of the civilised literature of ancient Greece. He was one of the great promoters of the new learning, and wherever he dwelt, his palace became a rendezvous for the disciples of science and the lovers of art. B. himself wrote a good deal, chiefly vindications of his master, Plato; e.g., his *Contra Calumniatorem Platonis* (Rome, 1469), and translations from the Greek authors; the *Memorabilia* of

Xenophon, the *Metaphysics* of Aristotle, and the *Characters* of Theophrastus. See Vart's *Le Cardinal B.* (Lond. 1879).

Bessèges, a town in the centre of a coal and iron mining district, in the French department of Gard, situated on the Ceze, 11½ miles N. from Alais, with which it is connected by a railway. Pop. (1872) 8036.

Bess'el, Friedrich Wilhelm, a distinguished modern astronomer, was born at Minden, July 22, 1784. His first important publication was in 1810, being some researches on the orbit of the great comet of 1807. For this he received the Lalande medal of the Academy of Sciences; and in the same year he superintended the erection and fitting up of the Königsberg Observatory, where, after three years of most patient and arduous observation, he obtained the annual parallax of 61 Cignl. In 1840 he indicated the existence of Neptune before its discovery by Leverrier and Adams. B. died March 17, 1846. His best-known systematic works are the *Fundamenta Astronomiæ deducta ex Observationibus*, J. Bradley (Königsb. 1818); *Tabula Regiomontanæ Reductionum Observationum ab An. 1750 usque ad An. 1830 computata* (Königsb. 1830); *Astronom. Untersuchungen* (1841-42); and his *Populäre Vorlesungen über wissenschaftl. Gegenstände* (pub. by Schumacher 1848). The *Abhandlungen* are now (November 1875) being published by Dr Engelmann, formerly of Leipsic Observatory, in 3 vols. See B.'s *Briefwechsel mit Olbers* (ed. by Erman, 2 vols. 1852).

Bess'emer, Henry, engineer and inventor, was born in Hertfordshire in 1813, and is chiefly known in connection with the celebrated process for making steel which bears his name—a process which has effected an entire revolution in the steel trade. This important invention is described in the following article. Mr B. has distinguished himself by many other inventions and scientific improvements. In 1875 considerable attention was attracted by what was known as the B.-saloon steamer, which was designed to counteract the unpleasant motion of the sea by means of a swinging cabin, to be kept in position by an ingenious arrangement of machinery. But after several experiments in the English Channel with a large steamer built for the purpose, the invention has apparently failed. In 1871 Mr B. was appointed president of the Iron and Steel Institute.

Bess'emer Steel is steel made direct from cast-iron by a process patented in 1855, and subsequently, by Mr Henry B. This process, as now worked, is briefly as follows:—The pig-iron is remelted in a cupola, and poured into a large vessel called a converter, lined with firebrick, and capable of revolving upon horizontal trunnions. The converter is then turned up, and air at a high pressure is blown upwards through the liquid metal. Most of the silicon is first burnt out, a dull flame appearing at the mouth of the converter; presently the carbon begins to burn (combining with the oxygen of the blast), and the flame increases to a dense, white, roaring blaze, accompanied by most violent ebullition. This continues until the decarburisation is complete, when the flame suddenly contracts. The converter is then turned down, and a measured quantity (about 6 or 8 per cent.) of *spiegeleisen* (iron containing about 10 per cent. of manganese) is run into it. This is sufficient to add the required amount of carbon for the steel, and after the occurrence of a further short 'flaming reaction,' the liquid steel is run out into ladles, and thence into moulds.

The use of *spiegeleisen* was patented by Mr Robert Mushet in 1856, but the patent was subsequently allowed to lapse. It is, however, of the greatest importance in the B. process, not only for the reason mentioned, but also because the manganese combines with the oxygen left in the iron by the passage through it of such a large body of air, which would otherwise have a most deleterious effect on the quality of the steel produced.

In Sweden and Germany, where manganiferous ores are frequently used, the decarburising of the liquid metal is generally stopped short at the required point, and the steel run off;—the exact instant at which the point for turning down the converter is reached being determined by the spectroscope. This beautiful application of the principles of spectrum analysis is, we believe, due to Professor Roscoe. The remelting of the pig in a cupola is also frequently dispensed with abroad.

A great drawback to the B. process is that it does not eliminate in any sensible degree either sulphur or phosphorus, if these most injurious materials are present in the pig-iron. It can

therefore only be employed with pure irons, a great limitation to its usefulness. See **STEEL**.

Bessenova, a large Austrian village in the Woivodina, situated on the Aranka, 128 miles S.E. by S. of Pesth. Pop. 7896.

Bessières, Jean Baptiste, Duke of Istria, born at Priessac, near Cahors, August 6, 1768, served as a common soldier first in the guard of Louis XVI., and afterwards in the army of the Pyrenees. He fought in the battles of Roveredo and Rivoli, was made (1798) general of brigade of the expedition to Egypt, and later, as general of division, secured the victory of Marengo by a sharp cavalry attack. At the battles of Austerlitz, Jena, Eylau, and Friedland, B. greatly distinguished himself, rising to the rank of marshal in 1804, and being made Duke of Istria in 1807. During the war in Spain (1808) he was appointed by Napoleon to the command of the reserve cavalry, a post which he had also held in the Austrian campaign (1805); and while again serving in Spain he was made governor of Old Castile, and commanded the guards in 1812. B. went through the horrors of the Russian campaign, showing skill and courage at every step of the retreat from Moscow. He fell while reconnoitring the Rippach, before the battle of Lützen, May 1, 1813. B. died poor, and his son received, by the bequest of Napoleon, a sum of £4000.

Bes'tiaires (Fr., from Lat. *Bestiaria*), the name given to a class of books very popular during the middle ages. They were the text-books of the zoology of that period, describing animals fabled as well as real, and generally illustrated with rude drawings. Symbolism was the science most prominent in the B.; they indicated in the brute creation types of various forms of good and evil in man—an idea still prevalent. The grotesque forms and faces carved on churches of the middle ages are expressions of this symbolism. The word B. is also used (like the Lat. *Bestiarii*) to denote persons who fought with wild beasts in the circus.

Bestus'chew, Alexander, a poet and novelist of Russia, well known under the pseudonym *Kosack Martynski*, born in 1795, was in early life master of the horse to the Duke of Wurtemberg, and was one of the conspirators (Dekabrists) of 1825. He was banished to Siberia (Yakutsk), but subsequently served in the army of the Caucasus, and was killed in a fight near Jekaterinodar, June 1837. Together with Kylejew, his brilliant friend, B. established the first Russian almanack, *The Polar Star* (St Petersburg, 1823). His chief works are *Mullah-Nur*, a wild tale, and *Ammalath-Beg*, a romance of the camp and field. His collected works were published in St Petersburg in 12 vols., 1839-40 (Ger. transl. Leips. 1845, 4 vols.). An interesting volume of his *Letters* was issued in 1860. B. had three brothers, Nikolas, Mikail, and Pieter, all of whom were exiled to Siberia on account of the military revolt of 1825.

Betan'zos (the ancient *Brigantium Flavium*), a town of Spain, province of Coruña, 15 miles S.E. of the city of Coruña. It has manufactures of linen, leather, and earthenware. Pop. under 5000.

Betal, or **Betal-Nuts**, the fruit of a tall graceful palm-tree, *Areca Catechu*, a native of the East Indian Archipelago, but cultivated in most tropical parts of the East. The tree is held in very high esteem in the East, and from its Malay name, *Pinang*, arises that of the British possession Penang. The fruit is about the size of a small chestnut, and exceedingly hard, so that it takes a fine polish when cut or turned. These properties, together with its pretty white and brown mottled structure, make it useful for button-making, to which it is sometimes applied in Western countries. But the great use of B.-nuts is for chewing, a practice universal in oriental countries. A small piece of the B.-nut is wrapped up with an equal proportion of lime within a leaf of the B.-pepper, *Chavica B.*, and rubbed against the teeth. The mixture is thereafter chewed a little, and placed between the gums and the lips, when a copious exudation of saliva of a brick-red colour takes place. A little tobacco is added to the chew when such a luxury can be afforded. The habit is very destructive to the teeth, and the appearance presented in chewing B. is very repulsive, but it is a passion among all classes in China and the Indian Archipelago. The B.-nut contains chiefly catechu, tannic and gallic acids, and a red colouring substance. A variety of Catechu (q. v.) is prepared from it.

Be'telgeuse, a star of the first magnitude in the right shoulder of Orion, forming with Procyon and Sirius a magnificent sub-equilateral triangle.

Betal-Pepper, or **Betal-Pawn**, various species of pepper, such as *Chavica Betel*, *C. Siraboa*, and *C. Malamiri*, extensively cultivated for the purpose of wrapping round the B.-nuts (ut supra).

Beth'any (Heb. 'house of dates'), a village 1½ miles from Jerusalem on the road to Jericho. B. never came into notice till the time of Christ, who made it his headquarters in Judaea, very much what Capernaum was in Galilee. It is now a wretched hamlet of about 20 families, called El-Azariyeh ('the place of Lazarus').

Beth'el (Heb. 'house of God'), the name given by Jacob to a place originally called Luz, of which there are two different accounts, Gen. xxviii. and xxxv. It appears, however (Gen. xii. 8), to have had the name of B. in the time of Abraham. The city found on the spot at the invasion of Canaan became a boundary town between Ephraim and Benjamin (Josh. xviii. 22).

Bethesda, **Pool of** (Syr. 'house of mercy,' or Heb. 'place of the flowing'—of water), according to the Gospel of John (v. 1-9), a pool with five 'porches' near the sheep-gate of Jerusalem, the water of which had miraculous healing power. The place now pointed out for it is close to the gate of St Stephen.

Bethlehem (Heb. 'house of bread'), a place second in interest only to Jerusalem itself in the sacred narrative, from being the birthplace of David and of Jesus, is about six miles from the latter city, and is now a village (*Beit Lahm*) of about 3000 inhabitants, who gain a livelihood chiefly by the manufacture of wine, and relics for pilgrims. The principal building is the convent of the Nativity, built by the Empress Helena, 327, beneath the church of which is a grotto, said to be the place where the Saviour was born, the 'manger' (a marble trough) in which he was laid also being there. Those who feel surprise at the idea of a cavern being pointed out as the place, ought to remember that in the gospel narrative there is no mention of a stable, which has been created by the imagination of poets and painters.—2. A city in the tribe of Zebulun (Josh. xix. 15), about six miles S. of Nazareth, now a miserable village.—3. A town in Pennsylvania, U.S., at the point where the Mannakiss flows into the Lehigh, 51 miles N. of Philadelphia. It is the chief settlement of the Moravian brethren in N. America, and was founded in 1741. B. is the seat of a bishop, has a fine church, some manufactures and tanneries, and a pop. of 4512. The three separate establishments of the Moravians for youths, maidens, and widows are distinguished by an almost monastic severity of life. In the excellent boarding-schools connected with these, the children of other religious denominations are received.

Bethlehemites, an order of monks at Cambridge in the 13th c.; also an order founded in Guatemala in 1673. The followers of Huss were styled B., after Bethlehem Chapel, in Prague, where Huss preached.

Beth'nal Green, a parish in the E. of London, Middlesex, with a pop. (1871) of 120,104. It is largely occupied by silk-weavers, who carry on their occupation at home. Between 1840-50 no fewer than ten churches were erected and endowed in the parish, chiefly by the efforts of Bishop Bloomfield. The charitable foundations are numerous, and the Baroness Burdett-Coutts has made the parish a theatre of her active and intelligent philanthropy. Within its limits are the Victoria Park, and the East London Museum, a branch of South Kensington Museum, opened by the Prince of Wales, June 24, 1872. B. has a place in English literature through the simple but touching ballad, *The Blind Beggar of B. G.*

Beth Root, or **Birth Root**, the root of the purple *Trillium erectum*, used in the United States as an astringent, tonic, and antiseptic. It is used especially in menorrhagia.

Bethsa'da (Syr. the 'house of fish'), the name of two places on the Lake of Galilee: one on the W. side, the native town of Philip, Andrew, and Peter (John i. 44); the other on the E. side (comp. Matt. xiv. 13, Mark vi. 31-45, and Luke ix. 10-17), a village which was rebuilt by Philip the Tetrarch and called Julia.

Beth'shemesh (Heb. 'house of the sun').—1. A city within the territory of Dan (mod. *Ain es-Sheims*), but belonging to the

priests of Judah, chiefly celebrated as the place to which the Philistines brought the ark from Ekron (1 Sam. vi.).—2. A town of Issachar; and 3. of Naphtali (Josh. xix.).—4. A city of Egypt, mentioned Jer. xliii. 13, the same as On (Gen. xli. 45).

Bethlen-Gabor (*i.e.*, Gabriel B.), born in 1580, of an ancient Protestant family in Upper Hungary and Transylvania, became king of Transylvania in 1613 on the death of Gabriel Bathori. See BATHORI. The Ottoman influence was exerted in his favour. When in 1619 the Bohemians revolted under Friedrich, the Elector Palatine, against Ferdinand II., B. invaded Hungary, took Kaschau (about 30 miles N. of Tokay), and, after repeatedly defeating Dampierre and Count Bucquoy, was crowned king of Hungary, Dalmatia, Croatia, and Slavonia at Presburg, 25th August 1620. Even Vienna was threatened, a junction having been effected between the Bohemian and Transylvanian armies. In spite of the desertion of the Elector by the Protestant Union at the Pacification of Ulm, and the advances made at Presburg by the French ambassador, Angoulême, B. despatched a body of troops which took part in the battle of Prague (8th November 1620). Shortly after he again attacked Austria, Count Thion and many Bohemians serving in his army: Dampierre was killed at Presburg, Bucquoy at Neuhausel; and although Count Mansfield was the only enemy of Austria in the N., Ferdinand was compelled by the treaty of Nikolsburg to cede seven eastern provinces of Hungary, and some territories in Silesia, B. renouncing the crown of Hungary, and becoming prince of the empire. B.'s marriage with Katharina of Brandenburg induced him for some time, with Mansfield and Weimar, to support the Protestant cause in the Thirty Years' War. The Sultan, Morad III., intended to make B. ruler over Moldavia and Wallachia. Sir Thomas Roe's mission to Constantinople had reference to the relations of B. and the Sultan, which the Protestant princes looked on with suspicion. B. died 15th November 1629. Whatever may be thought of his policy, B. contributed to the independence and progress in learning of his country: he founded the Reformed College at Enyed.—**Johann and Wolfgang B.**, both chancellors of Transylvania, belong to the same family, and have left Latin histories of their country for the periods 1620-63 and 1526-1609, the latter of which was published by Benkő, under the title *Wolgangi de B. Historia de Rebus Transylvanicis* (6 vols. Hermannst, 1792).

Bethune, a fortified town of France, department of Pas-de-Calais, on the river Brette, the *Canaux de B.*, and the *Chemin de Fer du Nord*. Pop. (1872) 4204. It has linen and woollen manufactures, and a considerable trade in corn, wine, brandy, and cheese. The town sprang up round the strong castle of the lords of B., was a considerable place in the 12th c., went by marriage to the Counts of Flanders, then had counts of its own, who became extinct in the 17th c.

The family of B. is very old. It traces its origin to a Robert Faissaux de B. of the 10th c., one of whose descendants, François de B., Baron de Rosny, embraced Calvinism, and was taken prisoner at the battle of Jarnac. Two lines were founded by his two sons, of whom one was the famous **Maximilien de B.**, Duc de Sully (q. v.). Both became extinct in the beginning of the present century. But other branches of the B. family still flourish in France.

Betjuans. See BECHUANS.

Beton. See CONCRETE.

Betroth'ment is an engagement to marry. In England, should either man or woman secede from their engagement, the aggrieved one has ground for an action for damage. In Scotland it is so also; but in that country B. with certain consequences may constitute marriage. See MARRIAGE, PROMISE.

Bett'erton, Thomas, actor, born at Westminster in 1635, began to perform in 1659 at the Cockpit, Drury Lane. He was introduced by the Laureate, Davenant, to the favour of Charles II., who sent him to Paris to study the French stage. His chief parts were Hamlet; Valentine, in Congreve's *Love for Love*; Alvarez, in Vanbrugh's *Mistake*, &c. His wife (*née* Sanderson) played Lady Macbeth very well, and is described by Cibber as 'at once tremendous and delightful.' A description of B.'s benefit in 1709 (he had previously lost most of his savings) is given in *Tatler*, No. 1. B. died 28th April 1710. He wrote *The Amorous Widow*, and *Barnaby Brittle*, an adaptation of the former; besides a tragedy entitled *The Unjust Judge, or Appius*

and *Virginia*. It was during B.'s connection with the Duke's Theatre (Lincoln's Inn Fields) that *Macbeth* and the *Tempest* were produced as semi-operas with Matthew Lock's music. This stimulated the development of moving scenery.

Bett'ing or Wa'gering is, on an extensive scale, especially an English custom. It mainly prevails in England with regard to horse-racing, on which it may truly be said that the highest and the lowest in the land are engaged in betting. Of recent years an uneasy feeling seems to have been gaining ground in British society that its favourite amusement is not wholly in accordance with morality, and that all outward signs of its prevalence ought therefore to be suppressed. This feeling has led to the passing of an Act of Parliament for the suppression of B.-houses. Any such establishment is declared to be a common nuisance, and the owner is liable to a penalty of £100. The Act, which now extends to Scotland, makes various minor provisions for the suppression of B. and W.

Bet'ula, and Betula'ceæ. See AMENTA'CEÆ and BIRCH.

Bet'wah, a broad but shallow river of India, rising in the Vindhya mountains, in the Bhopal territory, passes the towns of Bileah and Jhansi on its way to the Jumna, which it joins about 200 miles above the junction of the latter with the Ganges, after a course of about 340 miles.

Beukelzoon, Willem, a native of Biervliet, Flemish Zeeland, who lived in the 14th c., and invented an improved method of salting and preserving fish. The invention is assigned to the year 1386, and is said to have greatly helped to develop the Dutch fisheries. B. died probably in 1397. The Emperor Karl V. and his sister Maria paid a grateful visit to his grave. The derivation of the word 'pickle' (Dut. *pekkel*) from Beukel is fantastic. That B. is not yet forgotten is evidenced by the fact that his praise was sung as late as 1827 by B. G. Camberlyn in a Latin poem, *De Beukelinge Genio*.

Beust, Friedrich Ferdinand, Count von, a German statesman, born at Dresden, 13th January 1809, after the usual diplomatic training, became Saxon minister at Munich (1838), at London (1846), at Berlin (1848), in 1849 minister for foreign affairs at Dresden (in which capacity he called in Prussian troops to suppress a popular rising), and subsequently minister for the interior under the tolerant and constitutional rule of King Johann. When the Schleswig-Holstein question came before the Bund, B. supported the nationalisation of the Duchies, and represented the Bund at the London Conference. Chiefly through his influence, Saxony joined in the revolution of the Bund against Prussia, 14th June 1866, and sent an army to co-operate with the Austrians in the Bohemian war. In this way Saxony narrowly escaped political annihilation, and B., dismissed from Dresden at the demand of Prussia, entered the service of Austria, where he became prime minister, and in 1867 adjusted with Deak the question of the Hungarian constitution. In 1871 B. became Austro-Hungarian Minister at London, and in 1878 at Paris. B. has a brother, **Friedrich Konstantin, Freiherr von B.** (born 1806), who is head of the mining-schools of Saxony, and has written on geology.

Beuthen, a Polish-speaking town in the government of Oppeln, Prussian Silesia, 50 miles S.E. of Oppeln. Pop. (1871) 17,946, engaged to a considerable extent in the manufacture of woollens and earthenware.

Bevel, in building construction, a sloping surface.

Beveland, Noord (N.) and Zuid (S.), two islands in the estuary of the Scheldt, in the Dutch province of Zeeland, constituting with the small island of Wolfaartsdijk the district of B., of which the area is 120 sq. miles, and the pop. 23,000. Zuid B., or *Land van ter Goes*, is the larger and more fertile, producing corn, madder, fruit, and vegetables. Area, 25 sq. miles; pop. 23,000. Its chief town, Goes or Tergoes (pop. 5205), has a trade in corn and hops, and some shipbuilding. Noord B., or *Land of Kortgene*, is low and marshy, but much improvement has been effected by embankments and drainage. Area, 18 sq. miles; pop. 5300.

Bevelled Gear. See GEARING.

Bevel-Wheel, a wheel (generally furnished with teeth), of which the 'pitch surface' is the frustum of a cone. B.-wheels are used to communicate rotation between shafts which lie in the same plane, but are not parallel.

Beveridge, William, a distinguished theologian and orien-

talist, was born at Barrow in Leicestershire, in 1636-37. He was educated at Cambridge, and such was his devotion to the study of oriental languages, that he was able to publish a Latin treatise on them at the age of twenty. B. declined in 1691 the bishopric of Bath and Wells, but accepted that of St Asaph in 1704. He died 5th March 1708, leaving the most of his property to the Society for the Promotion of Christian Knowledge. His works, which were voluminous, were published in 1824, under the editorship of the Rev. T. H. Horne.

Beverland, Adrian, a learned Dutchman, was born at Middleburg in Zeeland, in 1653 or 1654, and studied for the bar. In 1678 he published his *Peccatum Originale*, which for its obscenity was burnt at the Hague, and caused his expulsion from Leyden and Utrecht. Two years later his *De Stolata Virginitatis Jure Lucubratio*, of which two French imitations were published, procured for him still greater odium, and he passed over to England, where he received countenance from Isaac Vossius, who admired his learning. His income was not great, but he spent it chiefly in the purchase of scarce books, obscene drawings, &c. In 1689 he repudiated his earlier writings, and destroyed all the copies he could recover. It is said that his treatise *De Fornicatione Cavenda Admonitio sive Adhortatio ad Pudicitiam et Castitatem* (Lond. 1698) was composed as an atonement for his previous literary wickedness. He died insane in 1712. His collection of licentious engravings, on which he had written illustrative passages from the ancient poets, was destroyed before his death.

Beverley, the chief town of the E. Riding of Yorkshire, 10 miles N.N.W. of Hull, connected with the river Hull by a canal, and a station on the N. Eastern Railway, has large manufactures of implements of husbandry, machinery, and beer, and a trade in corn, coal, leather, and cattle. B. grew up around a priory, founded in the beginning of the 8th c., and was called from a neighbouring morass *Beverlac*—i.e. *lake of beavers*. The minster of B., or collegiate church of St John, founded in the 13th c., is one of the finest Gothic structures in the kingdom. B. returned two members to Parliament from the time of Elizabeth till 1870, when it was disfranchised under the new Reform Act on account of corrupt electioneering practices. Pop. (1871) 10,218.

Beverloo', in the province of Belgian Limbourg, 12 miles N.W. of Hasselt, in the Campine, is noted for its permanent military camp, the Belgian Aldershot.

Beverwyk (Du. *Beverwijk*), a very clean town in North Holland, on the IJ, about 7 miles N. of Haarlem, with a pop. of 2500. Near it the Prince of Orange, Stadtholder, and afterwards William III. of England, had a country residence.

Bewdley, a market-town in Worcestershire, beautifully situated (hence its original name, *Beaulieu*) on the western bank of the Severn, 13 miles N. by W. from Worcester. Pop. (1871) 3021; of parliamentary borough, 7614.

Bewick, Thomas, the first great English wood-engraver, born in 1753, at Cherryburn, near Newcastle-on-Tyne, was apprenticed to his art in Newcastle (1767), and made such rapid progress that in 1775 one of his illustrations of Gay's *Fables*—the cut known as the 'Old Hound'—won the first prize for wood-engraving from the Society of Arts. In 1790 appeared the *General History of Quadrupeds*, with illustrations by B. and his brother John, who was an engraver and draughtsman of scarcely inferior genius. Goldsmith's *Traveller* and *Deserted Village*, Parnell's *Hermits* and Somerville's *Chase*, were illustrated by the brothers; but in 1797, after the death of John, the first volume of the *History of British Birds* appeared with cuts designed and engraved by B. exclusively, and was followed in 1804 by a second volume. Each of the cuts in B.'s greater works is in itself a poem or story, abounding in incident, and full of pathos or humour, and excelling as a work of art in its extreme simplicity of execution. There is no line without a thought. Among his latest works is *The Fables of Aesop and Others*, and his *chef-d'œuvre* is believed to be his cut of the Chillingham Park bull. B. died November 8, 1828. His technique, which consists of engraving white lines on a black ground, has been revived with great effect in late years by a school of French artists headed by Gustave Doré. In July 1875, Jane and Isabella, daughters of Thomas B., living at Gateshead, signified their intention of bequeathing a complete collection of the proofs, drawings, &c., of their father and uncle to the British Museum.

Bex, a small Swiss town, canton of Vaud (Ger. *Waadl*), on the Avençon, a tributary of the Rhone, 12 miles from Lake Geneva. There are hot mineral and salt springs in the vicinity. Pop. (1870) 3860. It is a station on the Swiss-Italian Railway.

Bexar, San Antonio de, a thriving town in county Bexar, Texas, on the San Antonio river, and the scene of the slaughter of Colonel Crockett and his men by the Mexicans. Pop. (1870) 12,256.

Beyerland, or *Beijerland*, an island of S. Holland, separated from the mainland by the Old Maas and the Holland Diep. Old B. is a thriving village on the island, with a population of about 4000.

Bey or Beg, a Turkish title of dignity, meaning 'lord,' which, when strictly applied, denotes the governor of a district or subdivision of a province, who bears a horse-tail as the sign of his rank. The higher title of *beglerbeg* (more correctly *beilerbeg*, 'lord of lords') is restricted to the governors of provinces, who have three horse-tails to mark their superior dignity. But generally the word B. is of wide enough import to comprehend the English titles prince, lord, general, captain.

Beyrout', or *Beirut*, the most important haven and commercial town of Syria, on a promontory at the base of Lebanon, 55 miles N.E. of Damascus. It is the Syrian entrepôt for European merchandise, having regular steamer communication fortnightly with Liverpool, and weekly with Marseille, and direct postal and telegraphic connection. The town has greatly improved of late years, the chief public work being the European system of waterworks, completed in 1875, bringing a supply of excellent water from the Bahr-el-Kelb or Dog River, a distance of 9 miles. Various roads have been laid down, and £10,000 has been (1875) granted for the erection of a harbour for coasting craft. There are extensive factories in the vicinity, producing 'Syrian silk,' now almost as much admired as that of India. The coal deposits of Lebanon are being utilised for this industry. In 1873 the imports amounted to £1,323,152; exports, £668,568. The former are chiefly cotton yarns, Manchester prints, Birmingham and Sheffield cutlery, petroleum from the United States, &c.; the latter, raw silk, dried cocoons, wool, olive oil, tobacco, fruits, horses and cattle. For the last fifteen years the general trade has not perceptibly increased, but since the opening of the Suez Canal a direct Eastern trade has sprung up in indigo, spices, and Mocha coffee. The stationary state of trade is ascribed to the obstructive Turkish imposts and regulations. Pop. (1873) 80,000, mostly Christians. B. is the Old Testament Berothai or Berothah, and the Roman Berytus, which was captured by the Christians under Baldwin I. of Jerusalem. It subsequently belonged to the Saracens, to the Seljuks, and finally to the Turks. B. sympathised with the Pasha of Egypt, and was bombarded and taken by the English fleet under Sir C. Napier (1840-41), when it was restored to Turkey.

Be'za (Fr. *Theodore de Bèze*, or rather *Beze*), was born 24th June 1519, at Vezelay, in Burgundy. Before he was ten years old he was sent to Orleans to study under Wolmar, a German Hellenist, and one of the first by whom the ideas of the Reformation were introduced into France. Under him B. acquired an excellent knowledge of the ancient languages, and also an acquaintance with the Scriptures. But the good impression of the lessons and the example of this good man, to which B. bore testimony thirty years after, was for the time smothered by the passions of youth. Surrounded in Paris with all that could mislead, rich, amiable, and full of spirit, he abandoned himself to enjoyment; published (1548) a volume of erotic poetry (*Juvenilia*); and contracted a marriage he dared not reveal, because, being intended by his friends for the Church, he was already drawing the revenues of several benefices. His conscience was roused by a severe illness, and on his recovery he went with his wife to Geneva (1548), abandoning 'at the same time,' in his own words, 'country, parents, friends, to follow Christ.' Soon after he became Professor of Greek at Lausanne, where he wrote his treatise *De Hereticis a Civili Magistratu Punien-dis* (Par. 1554), in defence of the burning of Servetus the year before, and in 1559 became pastor and Professor of Theology at Geneva. There he was associated with Calvin, who was ever after his guide and master, and to whom he became very much what Melancthon was to Luther. In the famous theological conferences held at Poissy and St Germain in 1561 and 1564,

B. signalled himself by the eloquence and zeal with which he maintained the Calvinistic dogmas, and made a very favourable impression on the French court. On the death of Calvin in 1564, B. stepped into his place, and was henceforth regarded, till his death, 13th October 1605, as the chief of the Reformers in Geneva as well as in France. The most important of his works, which were extremely numerous, are a translation of the New Testament into Latin, and a *History of the Reformed Churches of France*, to the year 1562 (Gen. 1580). B. naturally presents himself to our minds as a theologian; but he was essentially a scholar and a wit by nature, and but for the sins of his early years, which drove him into a penitential career, he would in all probability have been a brilliant luminary of French literature. See Bolzec, *Histoire de la Vie, Mœurs et Deportement de Théod. de Bèze* (Par. 1577); Fay, *De Vita et Obitu Theod. Bæze Vindob.* (Gen. 1606); Schlosser, *Leben des Theod. Bæze* (Heidelb. 1809); Baum, *Theod. Bæze, nach handschriftlichen Quellen* (Leips. 1843).

Bezant, or **Besant**, in heraldry, a small circular piece, either *or* (gold), which may have derived its name from the Byzantine coins which the Crusaders fixed upon their shields as heraldic devices; or *argent* (silver), which is called a *plate*, from the Spanish *plata*. When the shield or any charge is strewn with the former, it is styled *besanty* or *besanties*, with the latter, *platte*. Similar figures, in neither metal, but in colour, are called *roundles*.

Bezdan, an Austrian market-town, in the Woiwodina, situated about 2 miles E. of the Danube, and 10 miles W.N.W. of Zombor. Pop. 7782.

Beziers (anc. *Beterra*), a town of France, department of Hérault, not far from the junction of the Orbe and the Canal du Midi, and a station on the railway from Bordeaux to Cette, about 108 miles E. of Marseille. The situation is so beautiful that it has given rise to the proverb, *Si Deus in terris, vellet habitare Beterris* ('If God were to dwell on earth, it would be in Beterris'). The cathedral is a fine specimen of Gothic architecture. Soap, leather, glass, woollens, gloves, &c., are among the manufactures. Brandy is also extensively distilled. Pop. (1872) 27,533. B. is the *Beterra* of the Gallic Sectosages, was a Roman colony and a station of the Seventh Legion, whence its name *Beterra Septimanarum*, and has, among other remains of antiquity, the ruins of an amphitheatre. It shared the changes that affected Gaul during the dissolution of the Roman empire, was for a time the residence of the Frankish Counts of Septimania, and later on, in the wars of the Albigenses, was the scene of a horrible tragedy and crime, 22d July 1209. Stormed by a horde of 'Catholic Crusaders,' under the leadership of the Legate Milo and the Cistercian Abbot Arnold, 7000 of its inhabitants were burnt in the Church of the Madeleine, and 20,000 were massacred.

Bezoars, concretions formed in the stomach of various mammals, which, at one period, had an enormous reputation in medicine. They are still highly prized in Persia. Oriental or Persian B. are found in the goat; occidental B. are taken from the llamas of Peru; and German B. occur in the chamois.

Bhad'lee, a name applied in India to a species of millet (*Panicum pilosum*).

Bhadrinath, a town of Garhwal, Kumaun division (*Himalayan Tract*) of the N.W. Province of India, on the right bank of the Vishnuganga, an affluent of the Aluknunda, in the centre of a narrow valley, 10,204 feet above the sea-level. Its importance is due entirely to its temple, which is resorted to annually by numerous pilgrims, as many as 50,000 collecting on the grand periodic festivals, which recur at intervals of twelve years. The Brahmans and the other attendants on the temple abandon the town during winter, from the intensity of the cold.

Bhagavad-Gītā ('Revelations of the God') is the title given to a philosophical poem belonging perhaps to the brilliant age when Vikramāditya ruled in Northern India at Ujjayini (mod. *Ujain*), which is conjectured to have been about the middle of the 1st c. B.C. There are, however, no external data by which the time of its composition can be really fixed; and it is only by a consideration of the style, the general character of the teaching, and the drift of particular passages, that scholars have been led to assign it to a period when Buddhism was still prevalent in

India. The B.-G. is one of the so-called 'episodes' of the Mahābhārata (q. v.), and some MSS. insert it in its 'proper' place in that poem; but in point of fact it has only a superficial connection with the great Indian epic. The main theme of the Mahābhārata is the strife between the Kurus and Pāndavas (kinsmen) for the sovereignty of Hastināpura (Delhi?), while in the B.-G. the circumstance of the strife is only introduced to furnish a framework for the dialogues which follow. The hostile armies are assembled on the 'sacred plain'; the trumpets sound the onset; Arjuna (a Pāndava prince), who is eager for the fray, has the god Krishna for his charioteer; but when the latter points out the numerous kinsmen and friends that are marshalled against him, horror suddenly seizes the prince, and throwing down his bow, he declares that not 'for the sovereignty of the triple world' would he imbrue his hands in his kinsmen's blood. To this Krishna replies with the arguments which form the didactic and philosophical doctrines of the work. In the end Arjuna is convinced that he may fight. 'My delusion is destroyed, and by thy favour, divine one, I have recovered my senses: I remain free from doubt, and will do thy bidding.' The B.-G. contains 18 chapters and 700 shlokas. According to its last English translator (Thomson), 'The whole work has been divided into three parts, each of six chapters. The first has been considered the purely practical portion, containing the principal doctrines for the practice of Yoga (spiritual devotion) generally, and more particularly for its adoption in the routine of everyday life, and may be said to follow Patanjali's rather than any other school. The second portion is purely theological, and displays the theories of the Theistic Sāṅkhya school, which we presume to have pre-existed. The third is the speculative or metaphysical portion, and follows more closely in the footsteps of Kapila and the pure Sāṅkhya.' The work is essentially eclectic and conciliatory; but on the whole, in the ethical and practical section, it vindicates the worship of the deity by actions (*Karma*) rather than by monastic devotion (*Jñānayoga*). 'A' the end of nearly every chapter Arjuna is exhorted to arise and fight; and the great dogma seems to be, that however bad or obnoxious one's own duty may be, it is better than that of another.' The B.-G. was first brought before the notice of the European world by the English translation of Sir Charles Wilkins (Lond. 1785), which was turned into French by M. Parraud (Par. 1787). The first edition of the Sanskrit text appeared at Calcutta in 1808, under the care of the Brahman Bābū-Rāma. The best editions of it are those of A. W. von Schlegel (Bonn, 1823), accompanied with a very literal translation and notes; and of Christian Lassen (Bonn, 1846). A Greek translation by Demetrios Galanos (Athens, 1846) is highly commended. The latest English version is that of Cockburn Thomson (Hert. 1855), with an introduction on Indian philosophy.

Bhagulpore (*Bhāgalpūr*), on the right bank of the Ganges, the chief town of a district of the same name, province of Bengal, British India, about 260 miles by rail N.W. of Calcutta. Pop. (1872) 69,678. There are many ruins in the neighbourhood of prehistoric antiquity, and modern shrines of the various religions. The district of B. has an area of 4327 sq. miles, with a pop. of 1,826,290. In 1876-77 the registered exports were valued at £521,000, including oil-seeds, wheat, rice, and indigo; the imports at £403,000, chiefly piece-goods, salt, and sugar.

Bhamo, a town of Burmah, on the left bank of the Irrawaddy, 200 miles N.N.E. of Mandalay (q. v.), contains over a thousand houses built on piles a few feet above the ground, for the advantage of free circulation of air, and has 5000 inhabitants. B. and its district are governed by a Woon who acts as king, and pays subsidy to the King of Burmah. The town is fast rising into importance, owing to its being the gate to the Shan States of Western China. Steamers have recently commenced to run between Rangoon and B., and large quantities of salt and piece-goods are sent thither in return for the products of Western China. A British resident is now established at B. for the protection of our commerce; and if the projected railway between B. and Talifu, in the basin of the Yangtse, be carried out, B. must become a great emporium of trade.

Bhang, the Eastern name for hemp, but now frequently applied to the intoxicating preparation made from it. See HEMP.

Bhanpura. See BAMPURA.

Bhargason, a town in the district of Khandesh, northern division of the province of Bombay, British India, with a pop. (1872) of 6153.

Bhartrihari, a famous Indian proverbialist, of whose life nothing is really known; but, according to the legend which has survived, he was a brother of the brilliant monarch Vikramaditya, who is supposed to have reigned about the middle of the 1st c. B.C. Originally a rake, he repented of his sins in his riper years, and closed his career as a hermit. The collection that goes by his name is believed to be in reality an anthology of the gathered beauty and wisdom of various men and various ages, which, with Eastern looseness in matters of fact, has been ascribed to one whose name had become conspicuous in the half-mythic traditions of the past. There are in all some 300 apophthegms, which contain many fine touches of natural description, sentiment, religious and philosophical reflections upon God, the soul, life, and immortality. An edition of B.'s sayings was published by Böhlen (Berl. 1833), to which he added *variae lectiones* (Berl. 1850), with a German translation in verse (Hamb. 1835). B. was the first Indian author known in Europe, two-thirds of B.'s collection having been translated more than two centuries ago by a German missionary, Abraham Roger, in his *Offene Thüre zum verborgenen Heidenthume* ('Open Gates to Hidden Heathenism,' Nurnb. 1653). Herder has given imitations of them in his *Zerstreuten Blättern*.

Bhatgong, a town of India, in the independent state of Nepal, about 9 miles from Khatmandu, the capital of the country. It has a fine palace, and a pop. of 12,000, chiefly Brahmans.

Bha'vani-Kudar, a town in the district of Coimbatore, province of Madras, India, 58 miles N.E. of the city of Coimbatore, is noted for its temples of Vishnu and Siva.

Bhawulpur, the capital of a native (feudatory) state of the same name in India, under the government of the Punjab, on the S. of the Punjab, is situated on the Ghara, which falls into the Chenab a little farther down. Pop. about 20,000. The immediate neighbourhood of the town is very fertile, as also the strip of land skirting the Ghara and Indus. The principal products of manufacture are scarfs, chintzes, turbans, &c. Area of state, 15,000 sq. miles; pop. (1868) 472,791.

Bheels, a Dravidic race inhabiting part of the region between the Tapti and the Nerbudda. They are believed to be a relic of the Indian aborigines driven from the plains into the wilder hill regions by the victorious advance of the Aryan Rajputs. Many of them are still in a very savage and degraded state, and can hardly be considered as anything else than caterans. They were long a source of great trouble to the British Government, as they used to burst out of their mountain jungles and commit horrible atrocities. At length, in 1828, a British force was sent against them; but, although they were subdued, it was soon felt that some permanent force was required to maintain order among them. At last, in the year 1840, a Bheel corps was raised (into which the wilder spirits were drafted), to keep order among the B. themselves, and to protect them from the grasping extortions of native kamdars; and since then a great improvement has taken place. The *Bheel Agency* comprises the seven small feudatory states of Dhar, Jabuah, Ali Rajpur, Johut, Kuttivara, Ruttonmal, and Mutwarh, with parts of Scindia and Holkar's territory, and forms a division of the Central India States. 'The inhabitants are almost entirely B. and Bheelalas; the latter descended from Rajput fathers and Bheel mothers, who, year by year, settle down to husbandry and peaceful habits. Occasionally, however, stung by some act of injustice or oppression, a chief, gathering his tribe around him, retires to the hills and jungles and breaks out into wild outlawry.' This relapse was exemplified in 1872-73 by Jugtia, the head of the Dussana B., who went 'out' with most of his tribe, and has not yet come 'in.' See *Annals of Indian Administration* for 1872-73.

Bhel or **Bael**. See **EGLE**.

Bhewndy, or **Bhiwan'di**, a town in the district of Tanna, province of Bombay, British India. Pop. (1872) 11,970.

Bhingarh, a town in the district of Ahmednuggur, province of Bombay, British India. Pop. (1872) 5752.

Bhojpur, a town near the Ganges, in the district of Rai Bareilly, province of Oude, British India, about 50 miles S. of Lucknow. Pop. 9000.

Bhoj, a fortified city of India, capital of Cutch, 35 miles N. of the Gulf of Cutch, possesses numerous fine temples and other public buildings. It is famous for its gold and silver manufactures. Pop. 20,000.

Bho'pal, one of the states in Central India, bordered W. by the Nerbudda River, has an area of 8200 sq. miles, and a pop. (1875) of 769,200. Revenue, £268,000; army, 3000 men and 57 guns. The dynasty, of Afghan origin, was founded in the reign of Aurunzib. The present (1879) ruler, a lady named Shah Jehan, has emulated the example of her mother in loyalty to the British and capacity for personal administration. The capital, also called B., about 176 miles N.W. of Nagpore, is surrounded by a dilapidated wall about 2 miles in length. Pop. 20,000.

Bhosawal, a town in the district of Khandesh, province of Bombay, 203 miles N.E. of Bombay city, lies near the left bank of the Tapti, and is a station on the Bombay and Benares Railway. Pop. (1872) 6804.

Bho'tan, or **Bhu'tan**, an independent state of India, N.E. of Bengal, on the S. slope of the Himalayas, with an area estimated at 10,000 sq. miles, and a pop. of 20,000. It is inhabited by a race (*Bhōts*, or *Bhutias*) who speak the Tibet dialect. Their spiritual head is styled Dharm Rajah, their temporal ruler, Deb Rajah. In religion they are Buddhists. Polygamy and polyandry are practised. The products are rice, maize, millet, musk, &c. Trade along the frontier is conducted at annual fairs. In 1876-77 the total exports into Bengal and Assam were valued at £20,000; the imports at £10,000. The capital is Tassissudon (q. v.).

Bhowan, or **Bhuwain**, a town in the district of Mozuffernuggur (Meerut), N.W. Province, British India, 55 miles W. of Delhi. It came into the possession of the British in 1809. Pop. (1872) 8481.

Bhu'ji, or **Bhujji**, a small feudatory state of India on the Upper Sutlege, in the province of the Punjab. It is not more than 20 miles in length and 7 in breadth, has a pop. of some 20,000, and is governed by a chief who pays a small tribute to the Viceroy of India.

Bhurtpore, the capital of the Jāt state of the same name in Rajputana, India, 30 miles W. of Agra, with which it has been connected by railway since 1872, and 100 S. of Delhi. It was founded by a freebooter named Birj, who (1799) built an almost inaccessible fort here, in which his descendant, Runjit Singh, sheltered Holkar after the battle of Dit in 1803. The latter act brought about the memorable siege of B. by Lord Lake, which ended, after the failure of four assaults, in its surrender, when Runjit Singh received back his dominions on paying an indemnity of £220,000, April 17, 1805. In 1826 there was a second siege, owing to a disputed succession, and the fort was stormed and afterwards dismantled by Lord Combermere. Pop. about 6000. The territory of B. produces good crops of grain, cotton, and sugar, but is scant of water. It has a very hot climate. Area, 1974 sq. miles; pop. (1871) 743,710. The Maharaja has been granted the right to adopt a successor, has a revenue of £242,000, and pays no tribute. The present ruler is proverbially a thrifty economist, and very careful of his money. The army and other establishments are all regularly paid at the end of the month, and the ryots are not subjected to any sort of exaction or extortion. See *Annals of Indian Administration* for 1872-73.

Biafra, **Bight of**, a portion of the Gulf of Guinea, extending from Cape Formosa to Cape Lopez, a coast distance of more than 800 miles. The northern shores, as far E. as the Old Calabar river, are flat and low; but to the S. of Rio del Rey, the Cameroon mountains rise to a considerable height. The chief rivers emptying into the B. are the Niger (in part), the Calabar rivers the Rio del Rey, the Cameroon, and Gaboon, at the mouth of which last is George's Town, or Naango, the chief resort of European traders.

Bialystok, the Polish name of the now Russian Bjalostok, a town in the government of Grodno, Western Russia, on the river Bial, 95 miles to the N.E. of Warsaw by rail. It has manufac-

tures of leather, soap, woollens, &c. The town has a fine castle, with a magnificent garden and park, laid out at great expense by Count Branicki. Pop. (1867) 16,985. The province has a pop. of 265,944.

Biana, a town in the Rajput territory of Bhurtore, India, 23 miles S.W. of Bhurtore. It was formerly fortified; and the numerous ruins of temples and buildings in its neighbourhood attest its former greatness. In its vicinity is the *Bhim Lat*, or 'Staff of Bhim,' a stone pillar, visible at a great distance.

Biancavilla, a town in the province of Catania, Sicily, on the S.W. of Mount Ætna, 14 miles N.W. of the town of Catania. It trades in silk, cotton, and cereals. Pop. (1872) 9328.

Bianchini, Francesco, an Italian astronomer and antiquarian, was born at Verona, December 13, 1662, studied at Padua, and then proceeded to Rome. He was employed by Clement XI. to reform the calendar; and he undertook the task of drawing a meridian line from the Adriatic to the Mediterranean. His most famous work is his *Storia Universale* (Rome 1694); but his edition of the work of Anastasius, *De Vitis Romanarum Pontificum*, completed by his nephew Giuseppe B. (4 vols. Rome 1718-34), is also highly valued. B. died at Rome, March 2, 1729.

Biard, Auguste-François, a French genre-painter, was born at Lyon, 27th June 1800, studied at the school of design there, and was appointed in 1827 draughtsman on board a corvette, in which he visited various countries on the Mediterranean. Later (1839) he visited Greenland and Spitzbergen; in 1859, Mexico, and in 1865 undertook a pictorial journey round the world, sketching numberless portraits, groups, &c. His 'Attack of Brigands' was purchased by the Duchess de Berry, and his 'Les Comédiens Ambulants' (now in the Luxembourg) by the Government. His greatest successes, perhaps, have been in rendering burlesque groups, of which his 'Sequel of a Masquerade,' 'Family Concert,' and 'Good Gendarme' are favourable. B. belongs to no school, if it be not to that of nature, the facts of which he delineates with great freedom, and in open contempt of the unities.

Biarritz, a celebrated bathing-place in the Basses-Pyrénées, France, 5 miles S.W. of Bayonne, is much frequented by the French nobility, by Spaniards and Englishmen, and was formerly an autumn residence of the imperial family. Pop. (1872) 3164.

Bias, of Priene in Ionia, was one of the seven wise men of Greece, and flourished about 570 B.C. The 'wise men' earned their fame by uttering pithy maxims of practical wisdom; and several of those of B. are recorded by Diogenes Laertius. 'We should love men as if they might one day hate us.' 'The most difficult thing is to bear a change to the worse.' 'Do not praise an unworthy man on account of his riches.' 'Take wisdom as your supplies for travelling from youth to age, for it is the most secure of all possessions.' B. died suddenly after successfully pleading a cause before the judges.

Bib, Pout, or Whiting Pout (*Morrhua lusca*), a Teleostean fish belonging to the *Gadida* or cod family. It averages a foot in length, and possesses a remarkably deep body for its size. The back is arched; and the skin of the eyes and head being of a loose texture, the fish can inflate these parts at will. A dark spot exists at the pectoral fins, as in the whittings. The B. occurs very generally on the British coasts, and on those of Norway, Sweden, Greenland, and elsewhere. The Scotch name of this fish is the *Brassy*. It is esteemed as a marketable fish in London, and is said to be of finest flavour in October, November, and December.

Biberach, a fortified town of Würtemberg, circle of the Danube, at the point where the river B. joins the Riss, a station on the Würtemberg Railway, and situated on the Ulm-Ravensburg highroad, 23 miles S.S.W. of Ulm, with manufactures of toys, leather, paper, linen, cotton, lace, &c. It has also an important fruit-market. Its High Church is a fine building, originally of the year 1100, but much altered at a later date. The mineral waters of Jordansbad are in the vicinity. The inhabitants are noted not only for their industry, but their taste for art, and reckon many painters in their roll of burghesses. B. became an imperial free town in the time of Friedrich II. Moreau defeated the Austrians at B. in 1796, and again in 1800. Pop. (1875) 7376.

Bible, The, is the name given to the collective volume of the sacred writings recognised by Christians.

I. *The Name*.—The special object of all the designations which have been given to these writings has been to distinguish them as *holy writings* in a special sense, or as 'the writings' *par excellence*. The most ancient designation of the Jewish sacred writings is in the Book of Daniel (ix. 2), 'the books;' the Greek rendering of which (*ai bibloi*, or *ta biblia*), used by the Alexandrian Jews, occurs in the prologue to Ecclesiasticus, as well as in 2 Tim. iv. 13. Other and later names were *the writing*, or *the writings*, *the reading*, *the reading-book*, and hence 'the Book.' At a later time, when the sacred writings of Christianity had come into existence, these names were also transferred to them in the Christian Church, so that both collections were comprehended under the title 'Scripture,' 'Holy Scripture,' or 'Holy Scriptures,' the 'Sacred Letters.' The Greek title, *ta biblia*, employed by Chrysostom for the entire collection (in the Latin Church, 'Biblia') as a neuter plural, came to be used in Low Latin as a feminine singular, 'Biblia;' from which has arisen the use of B. as a singular noun in all modern European languages.

Of the whole collection, the part properly Jewish, and originally written in Hebrew, receives the name of the Old Testament, as distinguished from the New Testament, or the Christian Scriptures proper, which were originally written in Greek. St Paul (2 Cor. iii. 14) applied the name of the Old Covenant (A. V. Testament) to the whole scheme of the Jewish revelation—that is, God's covenant with the children of Israel under the mediation of Moses, in relation to the New Covenant under the mediation of the Messiah (Jer. xxxi. 31). In course of time, the titles Old and New Covenant were applied by metonymy to the writings relating to these, and the Greek word which meant sometimes 'covenant' and sometimes 'testament' was by the translators of the old Latin version always translated by the word *testamentum*, and the word has come into almost universal use as the title of the two parts of the B.

II. *The Old Testament*.—1. *The Contents*.—The Canon (q. v.) of the Hebrew Scriptures is exactly the same as that of the English B., but differently arranged. The arrangement is as follows:—1. 'The Law,' the five so-called Books of Moses, or the Pentateuch. 2. 'The Prophets,' subdivided into—(1) The former prophets (referring merely to their place in the canon)—viz., Joshua, Judges, 1st and 2d Samuel, 1st and 2d Kings; and (2) The latter prophets, including (a) the greater prophets (referring merely to the bulk of their extant writings), Isaiah, Jeremiah, Ezekiel, and (b) the twelve minor prophets—from Hosea to Malachi. 3. The (remaining) 'Books,' arranged thus:—(1) The Psalms, Proverbs, and Job; (2) The Song of Songs, Ruth, Lamentations, Ecclesiasticus, Esther; (3) Daniel, Ezra, Nehemiah, 1st and 2d Chronicles.

2. *History of the Canon*.—(A.) Among the Jews of Palestine. The groundwork of the Old Testament canon is confessedly the five 'Books of Moses,' or 'the Pentateuch' (q. v.). All that can be known with any degree of certainty regarding it is, that canonical authority was attached to it after the discovery of the Book of the Law (probably Deut. iv. 44-xxvi. and xxviii.) in the eighteenth year of Josiah, thirty-six years before the destruction of Jerusalem. It is at any rate certain that since the time of Ezra the Pentateuch has remained unaltered as the Book of the Law. As to the other books, in the Second Book of Maccabees (ii. 13) there is mention of the 'writings and commentaries of Neemias, and how he, founding a library, gathered together the acts (? books) of the kings, and the prophets, and of David.' The letter (from the Jews in Palestine to those in Egypt) in which this passage occurs is not authentic, but there is no reason for doubting the accuracy of the statement as it stands; so that there is evidently a reference to—(1) historical writings relating to the reigns of the kings of Israel and Judah; (2) prophetic writings—i.e., containing predictions of prophets; (3) certain writings of David, probably the Psalms, and not the Books of Samuel. As the order here indicated is that which prevails in the Hebrew canon, and from what is known independently of the origin of the various books, there is good ground for assuming—(1) that the books referred to as 'the (books) of the kings,' were the Books of Samuel and Kings; (2) that those 'of the prophets' were the prophetic writings now found in the second division of the canon; and (3) that the collection of Psalms was by this time brought to a close.

Further, since the object of Nehemiah in forming this collection was doubtless to include such books as would give a continuous history, from the point at which the Pentateuch left off down to the Babylonian captivity, we may also suppose that the Books of Joshua and Judges were admitted into the collection. Very probably the Book of Ruth, which supplied information about the forefathers of David, the ancestor of the kings of Judah, was at the same time admitted into the series of the historical books—a supposition which is rendered the more probable by the fact that by the 1st c. it was classed along with Judges as one book. Except the Book of Lamentations, which may be assumed, for similar reasons, to have had its place after the prophecies of Jeremiah, it cannot be decided whether any other of the books (besides those already mentioned—Psalms and Ruth) now in the third division of the canon were then admitted into Nehemiah's collection. Evidently this could be done only with those then in existence, and this can be asserted with certainty only of the Books of Job, Proverbs, and the Song of Solomon. The books composed after the time of Ezra and Nehemiah—Daniel, Esther, Ezra, Nehemiah, and Chronicles—are none of them placed in their chronological position among the books collected by Nehemiah; they are all placed after the Psalms and the other poetical books in the Hebrew canon—that is, showing the high authority to which that collection must have attained. Some of the books in the third division of the canon were not received into the number of the sacred writings without opposition—e.g., Esther and the three attributed to Solomon—and a considerable time elapsed before the canon was considered as finally completed. But several centuries before the time of Christ, a feeling seems to have prevailed among the Jews of Palestine that the Spirit of God no longer operated upon men in such a way as to produce works deserving to be reckoned Holy Scripture. Thus no work was received into the canon which was known to have been composed later than 100 years after the captivity. The Books of Daniel and Ecclesiastes were so received only because they were regarded as the writings of Daniel and Solomon.

(B.) Among the Hellenistic Jews, there seems reason for believing that the canon remained unsettled for a longer time, and that no marked distinction was made between the books which composed the Hebrew canon and several others of a later date. It is at any rate certain, that among the Jews of Alexandria, at the time of Christ, the limits of the canon had not been fixed. In the LXX., which was almost entirely used among them, several of the books of the Hebrew canon received considerable additions, and there were also several books not in the Hebrew canon at all. These additions form what is now called the Apocrypha (q. v.).

(C.) In the Christian Church, the books of the Old Testament were used from the first in the same way as by the Jews, as Holy Scriptures. It was but few, however, of the Christian writers who were acquainted with the Hebrew language; and by far the most of them knew the Old Testament only as it existed in the LXX. It thus happened that they often quoted as Holy Scripture passages from books not included in the Hebrew canon. This was continually pointed out by Jewish writers in their disputes with Christians, and the distinction was in general after the 4th c. observed in the Eastern and Greek Church, in which there was a tendency to reject from the canon also the Book of Esther. In the Latin Church, although there are catalogues belonging to the latter half of the 4th c. in which a distinction is made, the Apocrypha came to be generally regarded as belonging to the canon, along with the books of the Hebrew canon; so that these books were included in the ancient Latin translation made from the LXX.—the so-called Itala—and at a later time in the Vulgate, although the latter was made from the Hebrew. At the Reformation the Protestant Churches adhered strictly to the Hebrew canon.

3. *Translations.*—Of translations of the Hebrew text of the Old Testament, the first was that of the Septuagint (q. v.), made at Alexandria, where it was regarded as an authentic and even inspired version of the sacred books. By the Jews of Palestine it was regarded from the first with the most intense dislike. It was, besides, convicted of many inaccuracies, and a more literal translation into Greek, for the benefit of Jews unacquainted with Hebrew, was made by Aquila (q. v.), besides others by Theodotion (q. v.), Symmachus (q. v.), &c. In the Christian Church the LXX. had a higher and more lasting authority, being regarded by many as equally inspired with the Hebrew text; an authority

which it retains in the Greek Church to this day. The consequence of this was, that when a need arose for a translation of the Holy Scriptures into the vulgar tongue of any country, the Old Testament was translated from the LXX. This was especially the case with the Ethiopian, Egyptian, Armenian, Georgian, and Slavic translations. In the Latin Church, when Jerome (d. 420) made a fresh Latin translation direct from the Hebrew, it gave great offence at first, on account of the manifold variations from the LXX. and the translations made from it; but in course of time Jerome's version gained ground, and the LXX. lost its former importance. At the end of the 5th c. it was used similarly to the translations made from the LXX., and from the 7th c. it has been accepted as the current text (*vulgata editio*), is what is known in modern times as the Vulgate (q. v.), and has been directly or indirectly the parent of all the vernacular translations of Western Europe, with the exception of the Gothic, which was made from the Greek.

The English B.—To pass over the translation of fragments of the Old and New Testaments into Old English by Cadmon, Bede, Ælfred, Ælfric, &c., the first literal prose translation in English of a portion of the B. was made by Richard Rolle (died 1349). Another version was made about the same time, comprising the Gospels of Mark and Luke and all the Epistles of Paul; and another, in the Northern dialect, containing the Dominical Gospels for the year. Meanwhile the people were forbidden by the Church to possess any of the books of the B., except perhaps the psalter and the breviary, but especially to have any of these books translated into the vulgar tongue. It was in the face of this opposition of the Church that Wicliffe made his translation, which was finished in 1380. The revival of learning in the 15th c., and the invention of printing at the same time, afforded facilities for the translation and diffusion of the Scriptures previously unknown. Wicliffe's translation was made from the Vulgate, as he knew nothing of either Greek or Hebrew; but the reformers of the 16th c. were able to study the Scriptures in the original languages, while the printing-press multiplied the number of copies in a manner that was impossible before the invention of printing, although England was long in availing herself of the help of that useful art. The first part of the English B. printed was the 'seven penitential psalms,' in 1505. The whole of the New Testament was translated and published about 1526 by W. Tyndale, who also translated in 1529 the Pentateuch, the first English version direct from the Hebrew, and in the following year the Book of Jonah. The first complete English B. was printed by Miles Coverdale, a friend of Tyndale's, in 1535. Soon after there was published, under the sanction of the king (Henry VIII.), a new B., which bore on its title-page the name of Thomas Matthews, but the real editor of which was John Rogers, a friend of Tyndale's, whose version it closely resembles. In 1539 was published the great B., which was simply a revision of Matthews', with the omission of the prologues and notes, which savoured too much of heresy for the taste of the clergy. Next year (1540) there was published a new edition, with the translation in great part recast, and a preface by Cranmer, from which it got the name of Cranmer's B., though it is often confounded with the edition of 1539. A reprint of the 1540 edition was issued next year, bearing the names of the Bishops of Durham and Rochester. During the persecution under Mary, the English exiles at Geneva completed a new translation of the New Testament in 1557, and of the Old Testament in 1560, which sometimes goes by the name of the 'Breeches B.,' from the rendering of Genesis iii. 7 (authorised version, 'aprons'). Under Elizabeth new editions of Cranmer's B. were issued in 1562, 1566, and 1568; but it was felt to be very defective, and the Geneva B. satisfied none but the Puritan party. Accordingly Parker, Archbishop of Canterbury, set agoing a new translation, which was published in 1568, and got the name of the Bishop's B. New editions were issued in 1569 and in 1572, but it never became popular. As the Protestant exiles at Geneva in the reign of Mary had done, so the Popish exiles at Rheims in this reign produced a new version from the Vulgate: the New Testament in 1582, the Old Testament some years later. It was printed at Douay in 1609, and is hence called the Douay B. In 1604 James I. set agoing an entirely new translation, for which all the previous ones were to be utilised, that one being followed in every case which came nearest to the meaning of the original text. The work was intrusted to the most talented and learned men in the kingdom,

to the number of forty-seven, who were divided into companies, with a portion of the B. to each company; and was completed by the end of 1607. But with the time occupied in its revision, printing, &c., it was not issued till 1611: It is the version still in use. A company of translators are engaged at present (1879) preparing a revised translation; but the accuracy of King James's B. is apparent from the fact that its defects, after the lapse of two centuries and a half, are comparatively so few. See Dr. Eadie, *The English Bible: an External and Critical History of the various English Translations of Scripture* (1876).

III. *The New Testament*.—It is asserted by the conservative school of divines that the books of the New Testament were composed and the canon completed during the latter half of the 1st c. Some modern critics, on the other hand, assert that some of them—e.g., the Gospel of John and the Second Epistle of Peter—were not composed till about the middle of the 2d c. But granting that the books composing the canon were all written in the 1st c., it is at any rate certain that they were not at first all received as equally authoritative, and that the limits of the canon were not authoritatively fixed till the latter half of the 4th c. The earliest authoritative compositions received into the canon were undoubtedly the Epistles of Paul, written about 55. In the course of the 2d c. our four Gospels were received. By the middle of the 3d c. the four Gospels, Acts, thirteen Epistles of Paul, of Hebrews (by some regarded as the work of Paul, by others not), 1st Peter, and 1st John had been admitted into the canon. Regarding 2d and 3d John, 2d Peter, James, Jude, and the Apocalypse, there was still great difference of opinion. But besides these there existed, during the 2d and 3d centuries, a considerable number of what are now called apocryphal writings, for the most part childish fables about the life of Jesus and the apostles. Many of these, however, were then decidedly popular, and there was as great difference of opinion about excluding certain of them from the canon, as about including certain books now in it. Thus Origen included the Epistles of Barnabas, Clement, and the Shepherd of Hermas in his list of canonical books. The historian Eusebius gives a very exact statement of the views regarding the canon prevailing up to his own time (beginning of 4th c.). He divides the Scriptures into three classes: the recognised, the controverted, and the spurious. In the first class he places the four Gospels, Acts, the Epistles of Paul (which he elsewhere calls fourteen—i.e., including that to the Hebrews), of 1st Peter, and 1st John. In the second the Epistles of James, Jude, 2d Peter, and 2d and 3d John. Regarding the Book of the Revelation there was difference of opinion; the controversy regarding it having been connected with the millenarian controversy. The third class he divided into (1) spurious but harmless, or even instructive—e.g., the Acts of Paul, the Shepherd of Hermas, the Apocalypse of Peter, the Epistle of Barnabas, the Apostolic Constitutions; and (2) those which were also *absurd and impious*—e.g., the Gospels of Peter, Thomas, Matthias, the Acts of Andrew, of John, &c. The fixing of the canon, which was thus so far accomplished by this arrangement, was brought still nearer completion by the Councils of Laodicea, of Hippo, and of Carthage (the third). By the 59th canon of the Council of Laodicea (360–364), it was enacted that no uncanonical books should be used in the churches; and by the 60th that the twenty-six canonical books should be so used—i.e., all the books of our canon except the Apocalypse. By the Council of Carthage (397), the Apocalypse (of John) was included in the list of canonical books; and from this time the New Testament canon may be said to have been definitely settled.

Till the invention of printing, the New Testament, like the Old, was preserved in MSS., of which, considering the labour of transcribing, there were great numbers—one of the good things which we owe to the leisure of the monks; and, as the material employed was parchment, many of them are still in existence. The three oldest of these are the Sinaitic MS., so called because discovered by Dr Tischendorf in a convent at Mount Sinai in 1854 and 1859, now in the possession of the Emperor of Russia, and believed to be as old as the middle of the 4th c.; the Vatican MS., in the Vatican Library at Rome, believed to be as old as about the middle of the 4th c.; the Alexandrine MS., in the British Museum, so called because presented to Charles I. in 1628 by the Patriarch of Constantinople, formerly of Alexandria, and believed to have been written about the middle of the 5th c. The three contain both the Old and New Testaments. The history of the New Testa-

ment, after the invention of printing, is merged in that of the Old Testament, as given above.

The books on the subject of this article are exceedingly numerous. We can note only the most famous and useful. In English, there are Hartwell Horne's *Introduction to the Critical Study and Knowledge of the Holy Scriptures* (4 vols. Lond. 1856); Stowe's *Origin and History of the Books of the Bible* (Harlf. 1867); Dr Samuel Davidson's *Introduction to the Old Testament* (3 vols. Lond. 1862–63); and an *Introduction to the Study of the New Testament* (2 vols. Lond. 1868); Canon Westcott's *General Survey of the Canon of the New Testament* (4th ed. 1875), and Westcott's *Bible in the Church, and History of the English Bible*. The best book on the MSS. of the New Testament is Scrivener's *Plain Introduction to the Criticism of the New Testament* (2d ed. Camb. 1874); and a popular account of the subject is given in *The Words of the New Testament*, by Drs Milligan and Roberts (Edinb. 1873).

In German, the best introductions to the Old and New Testament are by De Wette, Fr. Bleek, and Reuss. Hilgenfeld has just published an introduction to the New Testament, giving the opinions of the Tübingen School (Leips. 1875).

Bible, Prohibition of the, is a practice of the Church of Rome, arising from her doctrine regarding the rule of faith. Protestants hold that the B. is sufficiently clear to be understood, under the guidance of the Holy Spirit, by the people to whom it is addressed; and that they are entitled and bound to judge for themselves what is its true meaning. Roman Catholics, on the other hand, teach that the Scriptures are so obscure that they need a visible, present, and infallible interpreter; and that the people, being incompetent to understand them, are bound to believe whatever doctrines the Church declares 'to be true and divine.' From this doctrine it follows that the use of the B. by the people is discountenanced by the Church of Rome. Accordingly, although it was never done by any general council, prohibitions have been repeatedly issued by popes—e.g., by Gregory VII., who ordained (1080) Latin to be the sole language of worship; and by Innocent III., Clement XI., and Pius IV., who prohibited the reading of the B. without permission from a priest. The consequence is, that the B. is practically inaccessible to the mass of the people in Roman Catholic countries.

Bible Society, an association having for its object the circulation of the Scriptures. An association had been founded at Halle in Germany by Charles Hildebrand for the purpose of printing Bibles, which was carried on for many years with unwearied activity; and by the end of the 18th c. had issued as many as 3,000,000 copies of the B. in German. The Religious Tract Society also, founded in 1799, though not properly confined to the dissemination of the Scriptures, has always made that a very prominent part of its labours. The first association known by the title of B. S. took its rise in England in 1780. It was intended solely for the benefit of soldiers and sailors, the movement being suggested by the idea of their frequent exposure to danger. The society was supported by 'voluntary, individual subscriptions, and collections at different places of worship;' and within two years they had distributed more than 11,000 Bibles among different regiments and ships' crews (one of the first to be supplied having been the Royal George), and expended upwards of £1500. The same society exists at the present day, under the title of the 'Naval and Military B. S.' Ten years later (1792), a number of persons in London formed themselves into an association called the 'French B. S.,' their object being to supply French Bibles to those who wanted them in France. But the attempt proved abortive amid the tumult of the French Revolution.

The greatest of all the associations of the kind is the 'British and Foreign B. S.,' which was started at the beginning of this c. Founded in 1804, chiefly in consequence of the desire of Thomas Charles of Bala to procure a supply of Welsh Bibles from the Religious Tract Society, in forty-eight years upwards of 700,000 had been printed and circulated in Wales. The constitution of the society is, that it exists only to spread among all nations the written Word of God, 'without note or comment,' of the Old and New Testaments, and the canonical books only. The income of the society is derived from collections, donations, legacies, &c. Its labours consist in circulating copies of the authorised version of the English B. in Great Britain and the British Possessions, and also copies in Gaelic and the other

Celtic dialects in Great Britain; and in printing and circulating translations prepared by missionaries in various countries. Of above 200 translations of the Bible which have been made into different languages and dialects, above 150 have been printed more or less directly in connection with the British and Foreign B. S. Its relations with the Continent of Europe also have always been of the most liberal nature. During the first ten years of its existence, forty-eight different societies, formed mostly in imitation of itself, in Germany, Hungary, Sweden, and Switzerland, in Finland, Denmark, Iceland, Courland, and Russia, had received from it 99,000 Bibles and 127,000 New Testaments. Up to the present time it has printed in the various languages of Europe above 9,000,000 copies. According to the report just issued for 1874-75, the receipts for the year amounted to £222,062, and the expenditure to £217,390. The issue of Bibles, Testaments, &c., was 2,619,427; since the establishment of the society, 74,000,000.

The auxiliary and branch societies connected with the preceding are too numerous to name. There are in Scotland two societies, which seem to be two branches of one founded in 1809—the 'National B. S. of Scotland,' and the 'Scottish B. S.' The American B. S., which is only second in importance to the British and Foreign, was founded at New York in 1817. The most important in Germany is the Prussian Central in Berlin, founded in 1814. The Russian B. S., which was founded at St Petersburg in 1813, was abolished by a ukase of Nicholas in 1826, although its place has since been so far filled by a Protestant one, which does not interfere with the members of the Greek Church.

Biblia Pau'perum ('Bible of the poor'), the name given to a picture-book forming a system of scriptural symbolism or typology, and representing, in from 40 to 50 plates, the principal incidents in the salvation of the human race by Jesus Christ, with brief elucidations and verses from the prophets, in Latin. A larger work of the same kind, with an expanded text in rhyme, was known as the *Speculum Humana Salvationis* ('Mirror of Human Salvation'). Before the Reformation, both were immensely popular with the preaching friars for homiletic purposes; and to laymen and clergy were often the sole source of their biblical knowledge. The Franciscans, Carthusians, and other orders, who called themselves *Pauperes Christi* ('Christ's poor'), made great use of the first work, hence its name B. P. MSS. of both are numerous, and reach as far back as the 13th c. They exercised a great influence on ecclesiastical art, being frequently copied in the sculptures, frescoes, glass-paintings, and altar-pieces of the middle ages, and were probably the very first works printed in the 15th c. by the xylographic system of Holland and the movable types of Germany.

Biblical Antiquities, or Archaeology, is the science which describes the political constitution, geography, manners, customs, laws, &c., of the nations mentioned in the Bible, as well as the usages of the Apostolic Church, for the purpose of elucidating the text of Scripture. The sources of B. A. are the Bible itself; the Apocrypha and Talmud; the writings of Josephus, Philo, Jewish rabbis, and Christian fathers; of Greek, Roman, and Arabic authors, and of travellers who have visited the countries mentioned. A prolific field has recently been discovered in the imperishable terra-cotta libraries of the Assyrian kings at Nineveh.

Bibliography, from the Gr. *bibliographia*, meant originally the transcribing of books, and *bibliographos* was a copyist. The term, however, now signifies the history and description of books, including notices of the materials of which they are composed, of the times when they were printed, of the presses from which they were issued, of their subsequent good or ill fortune, of the authors whose names they bore, of the classes into which they have been or may be arranged, and comprehends, indeed, information of every kind respecting them. The history of books in their earliest form, and of the materials composing them, is contained in the *Origin and Progress of the Art of Writing*, by Humphreys; and the origin and progress of the art of printing are narrated and illustrated in Meerman's *Origines Typographicae*, and in *Annales Typographici ab Artis Inventae Origine*, by Maittaire. Ames's *Typographical Antiquities* (1785-90) gives an account of the establishment of the art in England, and contains memoirs of our early printers. The

prompt appearance of the *Éditions Principes* of the classics is an admirable illustration of the rapid diffusion and development of the art throughout Europe. Within twenty years after its discovery, editions of nearly all the Latin classics had been printed. The first Greek book (the *Grammar* of Constantine Lascaris) was printed at Milan in 1476; and in 1494 the famous Aldus issued the first of a series of upwards of sixty Greek works, completed before his death in 1515. The compilation of a universal biographical dictionary was attempted by Conrad Gesner in his *Bibliotheca Universalis* (Zurich, 1545), which was, however, confined to Hebrew, Greek, and Latin books. The *B. Britannica* of Watt (Edinb. 1824) was designed by him to be a universal catalogue of the authors with whom this country is acquainted. Special or particular bibliographical dictionaries are many in number and various in character. Rare books are arranged and described in the *B. Curieuse, ou Catalogue Raisonné de Livres Rares* of David Clement (1750-56); and to this department also belong the *Manuel du Libraire et de l'Amateur des Livres* of Brunet (the 5th ed. 1860-65, now out of print), and the *Treasure of Rare and Precious Works* of Graesse (1859-60). Bohn's edition of Lowndes' *Bibliographer's Manual* (1857-64) contains an account of the rare, curious, and useful books of Great Britain. Some bibliographical works treat specially of the literature of particular countries, as, for example, the *Critical Dictionary of English Literature and British and American Authors*, by Allibone (1859-71); *La France Littéraire* (1827-39), by Querard; and its continuations by Louandre and Bourgueldt, and by Lorenz (1867-71); the *B. Hispana Vetus* and *B. Hispana Nova* of Antonio (1783-88); *Handbuch der Deutschen Literatur*, by Ersch, with supp.; *Allgemeines Bücher Lexicon* (1812-56), by Heinsius. Special works also are confined to the literature of the classical languages, such as those of Dibdin and Moss, and the useful handbook, *Guide to the Choice of Classical Books*, by Mayor. Renouard's *Annales de l'Imprimerie des Alde* (1834), and *Annales de l'Imprimerie des Estienne* (1837-38), are specimens of works that treat of the books issued from particular presses. The extensive and curious class of books published anonymously, or under feigned names, has long enchainé the interest of bibliographers. The best book in this department is the *Dictionnaire des Ouvrages Anonymes et Pseudonymes* of Barbier (1822-27). There appeared in 1868 the *Handbook of Fictitious Names* by Olphar Hamst (Ralph Thomas), being a guide to authors, chiefly in the lighter literature of the 19th c., who have written under assumed names, and to literary forgers, impostors, plagiarists, and imitators. The prospectus has been issued of the *Anonymous and Pseudonymous Literature of Great Britain* by the late Mr Samuel Halkett, continued by Mr Jamieson, his successor in the keepership of the Advocates' Library, and the Rev. John Laing, librarian of the New College, Edinburgh. The following works may be mentioned in addition as of interest to the student of this subject: *Bibliographie Instructive* (1768) of De Bure; the *Bibliographical Dictionary* of Dr Adam Clarke; Peignot's *Manuel Bibliographique*; Horne's *Introduction to the Study of B.*; and Egbert's *Bibliographical Dictionary* (translated from the German, 4 vols. 1837). See also Edwards' *Memoirs of Libraries* (Lond. 1859).

Bibliomanicy (Gr. *biblion*, *manteia*), a species of divination, which consisted of opening the Bible at hazard, selecting the first passage on which the eye fell, and deriving from its contents, or even its sound, fanciful indications of future events. B. was very prevalent for many centuries, and was prohibited by several Councils of the Church under pain of excommunication.

Bibliomaneia, literally book-madness, a compound from the Greek, expressive of the passion or irresistible desire for rare and curious books, still prevalent, but which reached its acme during the 18th c. The bibliomaneia values a book, not for its intrinsic excellence, but for some accident—as its rarity, its being on large paper, or on vellum (a tall copy, and a large paper copy are not the same), the press from which it issued, or the name of the binder. A defect, as the omission of *not* from the seventh commandment, in one impression of the English Bible gave a fictitious value to that impression; and the *Breaker Bible*, so called from its rendering of Genesis iii. 7, is a favourite with the bibliomane—so named by Isaac D'Israeli in his *Curiosities of Literature*, in his rendering of a passage of Jean Joseph Rive: 'A bibliomane is an indiscriminate accumulator, who

blunders faster than he buys, cock-brained and purge-heavy.' In Dibdin's *Bibliomania*, it is more than hinted that bibliomaniacs never read books. Jonathan Oldbuck, in the *Antiquary*, is a happy mixture of the bibliomane and the bibliophile—the latter of whom reads as well as collects. The Elzevir and Foulis editions of the classics were long highly prized, and still are so, though in a less degree. In the Elzevir *Caesar* of 1635, the number of the 149th page is misprinted 153; hence it acquired a factitious value, and imitations are detected by being unfortunately accurate in their paging at this critical place. Ridiculous prices have sometimes been paid for rare works. The first dated edition of the *Decameron* was purchased at the sale of the Duke of Roxburghe's library in 1812 by the Marquis of Blandford for £2260. The Roxburghe Club was hereupon established for the reprint of rare works, and was followed by the Bannatyne, Maitland, and Spalding Clubs in Scotland, the Camden, Percy, and other societies in England, and the Celtic Society in Ireland. A very charming book on the subject is Dr John Hill Burton's *Book-Hunter* (Edinb. 1862), in which affection, mockery, and criticism are pretty fairly blended.

Bioce, a name given to two pigments, a blue and a green, both of which are, however, prepared from carbonates of copper. They may either be made from the native carbonates, or be artificially prepared; and in the latter case they usually receive the names *mountain blue* and *mountain green* respectively.

Biceps, a muscle on the front of the arm. It arises by two heads (hence its name). The long head arises within the capsule of the shoulder-joint, 'from the upper border of the glenoid ligament,' and passes over the head of the Humerus (q. v.). The short head arises from the coracoid process of the scapula or shoulder-blade. These two heads unite to form the B. It is inserted into the tuberosity of the Radius (q. v.). From the tendon of insertion, a fibrous expansion is given off from its inner side, which passes downwards and blends with the fascia of the fore-arm. The chief action of the B. is to flex the elbow-joint. It also helps to raise the arm at the shoulder, and to turn the palm of the hand upward.

Bioêtre, an old castle to the S. of Paris, just beyond the fortifications, used as a military hospital until the erection of the Hôtel des Invalides, afterwards as a lunatic asylum and prison, now as a refuge for the aged poor, with 2750 beds. It was originally built in the reign of Charles V., and destroyed in 1634, but was rebuilt by Louis XIII.

Bichat, Marie François Xavier, one of the most celebrated of French physicians and anatomists, was born at Thoir-ette (Jura), November 11, 1771. He passed the first years of his medical study under the direction of his father, who was also a physician. After spending two years at Lyon, he repaired to Paris in 1793, and attended at the Hôtel-Dieu the clinical lectures of Desault, who being soon attracted by the superior intelligence evinced by B., took him as his assistant in his surgical practice and in preparing his lectures and works. After the death of his patron in 1795, B. showed his gratitude by publishing in 1797 two volumes entitled *Œuvres Chirurgicales de Desault*, setting forth the great surgeon's doctrines and methods of treatment. He then devoted himself to lecturing on anatomy, physiology, and surgery; and established with several of his friends *La Société Médicale d'Emulation*, through the medium of which he gave to the world many highly original and important memoirs, notably those on the tissues of the human body. He was nominated a physician of the Hôtel-Dieu in 1799, and died July 22, 1802, his premature death being hastened in great part by his incessant labours. B.'s three great works are the *Traité des Membranes* (Par. 1798), in which he classifies the different kinds of tissues, maintaining that all are merely differentiated forms of the same elementary tissue; the *Recherches Physiologiques sur la Vie et la Mort* (Par. 1800), a work rich in new discoveries and original ideas, in which he defines life to be the 'sum-total of the functions which resist death'; and the *Traité d'Anatomie générale* (2 vols. Par. 1801), in which he summarises his now generally received principles, applying them in the same systematic manner to the various departments of biology. See Bilon's *Éloge historique de B.* (Par. 1802).

Bick'erstaff, Isaac, a writer of English comedies, which had a considerable although evanescent popularity in the 18th c., was born in Ireland, 1735, and died about 1800. Of his per-

sonal history little is known, except that he was page to Lord Chesterfield, and was at one time an officer of marines, but was dismissed the service. His plays, of which *Love in a Village* (1762), the *Maid of the Mill* (1765), and *Lionel and Clarissa* (1768), are genuine specimens of comic opera, and several of his comedies and farces, of which he wrote twenty-two, were produced under Garrick's management, and were long deservedly popular. The name B. is also known as a *nom de plume* used by Swift and Steele.

Bick'ersteth, Rev. Edward, an active clergyman and missionary of the Church of England, was born at Kirkby Lonsdale, Westmoreland, March 19, 1786. After being a post-office clerk in London, and a solicitor in Norwich, he took such an interest in religion, that having been admitted to orders (1815), he went to Africa as a missionary. Returning after successfully organising missions there, he became secretary to the Church Missionary Society. He discharged the duties of this office with great energy and success till 1830, when he retired, on accepting the rectory of Wotton, in Hertfordshire. B., who died February 28, 1850, wrote several religious books, and took an energetic part as an 'Evangelical,' against Tractarianism and the endowment of Maynooth. See Birk's *Memoir of B.* (2 vols. Lond. 1815). His son, **Rev. Edward Henry B.** (born at Islington, 1825), is favourably known as a religious author and editor; and his brother, **Henry B.** (born 18th June 1783, died 18th April 1851), rose to distinction as a lawyer, and when promoted to the bench took the title of Lord Langdale.

Bicycle, the recent development of the *velocipede*, and the most popular of all modern athletic machines. It is a lightly-built vehicle, of from 30 to 60 lbs. weight, chiefly formed of iron and steel, and consisting mainly of two wheels (hence its name, from *bis*, twice, and *kyklos*, a circle), and of a simple but strong connecting frame. The front or 'driving' wheel is usually about twice the size of the other, and has a diameter averaging from 42 to 60 inches. The frame consists (1) of a 'backbone,' connecting the two parts of the B., supported at its lower extremity on the axle of the smaller wheel; (2) an erect bar, upwards of two-thirds forked to admit the driving-wheel, on the axle of which it rests; (3) a strong steel spring, placed over the backbone and supporting the 'saddle.' The erect bar rises from the axle of the driving-wheel to the upper end of the backbone, through an aperture in which it passes, having a free cylindrical motion, and terminates in a cross handle. This handle is the means of controlling the exact direction of the driving-wheel and therefore of the machine. Motion is given to the B. by the rider, seated in the saddle, pressing with his feet on revolving treadles attached by a crank to the axle of the driving-wheel; and when once set a-going, such is the lightness of the machine, it is capable of receiving great acceleration of impetus. The pace of an ordinary bicyclist is from 9 to 11 miles an hour, or about 60 miles a day, while that of a trained rider is 14 miles an hour, or about 90 miles a day. D. Stanton, of Brompton, ran 106 miles in 7 hours 58 min. 54½ sec. at Lilliebridge, W. Brompton, October 19, 1874.

The most striking qualities of the B. as a means of locomotion are, perhaps, its 'staying' power and its capacity of sustained balance. In long distances the B. is found to surpass the horse, a fact the less surprising when it is taken into account that the muscles called into play, those of the back and legs, are the strongest in the human body. More singular is it that the B. should preserve a perfectly steady balance on so narrow a base as the felloe of the wheels (one inch), and its power in this respect affords the physicist a fine illustration of the stability due to motion.

The earliest velocipede on record is a crude machine invented by Blanchard, the aéronaut, and described in the *Journal de Paris*, July 27, 1779. It was followed by that of Joseph Nicéphore Niepce, the famous French inventor, in 1818, and in the same year by the notorious 'dandy-horse' or 'Draisena,' a machine called a velocipede, which Baron von Drais of Mannheim patented in Paris and London, and which is described in *Ackermann's Repository* for February 1819. The present B. certainly embodies the main idea of Drais, but its improved form is due to an unknown Frenchman, whose work is supposed to have been produced about 1861. In 1866-67 the B. began to be popular in England, and the taste for it was confirmed by the races at the Crystal Palace, May 26, 1869. Many feats have

since been done on the B., the most remarkable, perhaps, being the journey of M. A. Laumailié from Paris to Vienna, via Strasburg, Munich, Linz, &c., October 12-23, 1875. In 1874 there were some 50 B.-clubs in Britain, and in the same year 102 racing matches, amateur and professional, took place. See Steinmann's *Velocipede* (1870), and *The B.*, by A. Howard (Lond. 1874).

Bidasso's, a river of Spain, which rises in the province of Navarra, and enters the Bay of Biscay near Fuenterrabia, forming the point of termination in the W. of the boundary between Spain and France. It is 55 miles long, and at its mouth lies the island where the treaty of the Pyrenees was concluded, November 7, 1659. The B. was the scene of several bloody conflicts during the Peninsular campaign, the most important of which was the victory of the Allies over the French, whom they forced to retire from the siege of San Sebastian with a loss of 16,000 men, August 31, 1813.

Biddle, John, who may be considered the father of English Unitarianism, was born at Wootton-under-Edge, Gloucestershire, 14th January 1615. He was educated at Oxford, and after graduation became master of Gloucester Free School, and performed his duties as such with great ability. Having, however, embraced and given utterance to opinions impugning the doctrines of the Trinity, he was expelled from his post, and ordered by the Puritan Parliament to be imprisoned for four years. Liberated by Cromwell's General Oblivion Act of 1654, he became pastor of an independent congregation; but a fresh publication of heresy once more exposed him to the wrath of a triumphant orthodoxy, and the Protector was driven to order him to be banished to one of the Scilly Isles (1655). When his term of punishment expired, he returned to London, to be again, however, apprehended after the restoration of Charles II., fined £100, and thrown into prison, where he died, of fever, September 22, 1662. His adherents were first known as Bidellians, then as Socinians, and finally as Unitarians.

Biddle, Nicholas, a celebrated American financier, born at Philadelphia, 8th January 1786. From 1819 to 1823 he was a director, and from 1823 to 1839 president, of the United States Bank. Under his guidance the affairs of the bank, previously disordered, soon became prosperous; but President Jackson, suspecting that the resources of the bank were employed for political purposes, refused to renew its charter; and, ceasing to be a national institution, it became insolvent in 1841, very much in consequence of the rash counsels of B., who died February 27, 1844. He wrote the *Commercial Digest*, a work published with the sanction of Congress, edited the *Philadelphia Portfolio*, and was a public speaker and essayist of considerable mark.

Bideford ('by the ford'), a seaport of Devonshire, on the Torridge, near where it enters the estuary of the Taw in the Bristol Channel, 34 miles N. of Plymouth. It has manufactures of sails, ropes, leather, and hardware, and exports naval stores, oak-bark, and iron. B. is accessible to vessels of 500 tons, and the river is here crossed by a bridge of 24 arches. In 1874 there were 109 vessels, of 7029 tons, belonging to B.; and in 1873, 729 vessels, of 38,007 tons, cleared the port. Pop. (1871) 6969.

Bidpai, also **Pilpai**, is the name popularly given to the unknown author of a collection of fables and stories which, in numerous translations and various forms, have for centuries been familiar both to the East and the West. Recent researches lead to the conclusion that its ultimate source is the ancient Indian work *Pantschatantra* (Sanskrit text, Kosegarten, 2 vols. Bonn, 1848-59; Ger. Benfey, 2 vols. Leips. 1859), which professes to be the composition of a certain Vishnuçarma, but has apparently received its present shape in the 2d c. B.C. under Buddhist influences. The *Pantschatantra* spread over all India in recensions differing more or less from each other, and in versions of all kinds passed into the languages of the N. and S. Indian races. The French translation of the work by Dubois (Par. 1826) is based on versions in Tamil, Telugu, and Canarese. In India itself the matter of the *Pantschatantra* was quite freely handled, as is proved by the manner in which it is epitomised in the *Kathasaritsagara* and the *Hitopadesa* (Sanskrit text, by Lassen and Schlegel, Bonn, 1829; by Johnson, Hertf. 1847; Eng. vers. by Wilkins and Jones; Ger. by Max Müller, Leips. 1844). The *Hitopadesa* in turn became a fertile source of translations into all Indian tongues.

It is not difficult, and it is very interesting, to trace the course of the old Sanskrit collection westward. First of all, under the Persian king Nushirvan, or Chosroes the Great (531-579), it was translated into Pehlevi by his physician Barsuye, under the title of *Katila and Dimnah* (from two jackals that are prominent in the first fable). This Persian version is no longer extant. Together with the rest of the old native literature it was destroyed by the Arabs after the country became Mohammedan. The *Pantschatantra* was next turned into Arabic in the reign of the Kalif Almansur (754-775) by Abdallah Ibn-Almokaffa, who in his introduction gives the name B. to the author, and says that he was the chief of the Indian philosophers. This Arabic version not only became the common property of the whole Moslem world, but was the vehicle through which the *Pantschatantra* found its way into Christendom. The Arabic text was published by Silvestre de Sacy (Par. 1816), and has been republished at Cairo (1836), Delhi (1850), &c. There is a German translation by Wolff (2 vols. Stuttg. 1837). Ibn-Almokaffa's version has given rise to many imitative works among Arabian and Arabico-Persian poets, which it is not necessary to specify. But it may be here noted, that with the spread of Mohammedanism a knowledge of the *Katila and Dimnah* was carried to the Afghans and Malays; while Buddhist missionaries from India at an early but uncertain date had made the substance of the original *Pantschatantra* familiar to Tibet, Mongolia, and China.

The Arabic *Katila and Dimnah* reached Europe in three ways:—1. Through the Greek translation of Symeon Seth, *Kytilé and Dimné*, executed about 1080 (published in an incomplete form by Stark, Berl. 1697; Athens, 1851), which was again turned into Latin by Possinus, and into Italian by an unknown author (Ferrara, 1583). 2. Through the Hebrew translation of Rabbi Joel, composed about 1250, which was put into a Latin dress between 1263 and 1278 by Joannes of Capua, under the title *Directorium Humana Vite*; alias, *Parabole Antiquorum Sapientium* (first printed in 1480). The *Directorium* in turn became the basis of a German version of the first half of the 14th c. by Duke Eberhard of Württemberg, which appeared at Ulm in 1485. 3. Through the Spanish translation, executed in 1251, in the reign of Alfonso X. This also was turned into Latin by Raymond of Déziers, a learned physician in the service of Queen Juana of Navarra, wife of Phil. le Bel. Partly from the version of Joannes of Capua, and partly from that of Raymond, come all the later mediæval and modern translations; the Spanish (Burgos, 1498), Italian (Flor. 1548), French (Lyon, 1556), English (Lond. 1570), Dutch (Amst. 1623), Danish (Copenh. 1618), Swedish (Stockh. 1743), German (latest, Leips. 1802; Eisen. 1803). See Loiseleur des Longchamps' *Essai sur les Fables Indiennes* (Par. 1838), and above all, Benfey's version of the *Pantschatantra* (Leips. 1859).

Biebrich, a village in the German province of Nassau, situated on the Rhine, possesses a splendid palace, the residence of the Dukes of Wiesbaden. Pop., with Mosbach (1871), 6642.

Biel, **Bel**, **Bialo**, are forms of a Slavonic word signifying 'white,' and entering into the composition of innumerable names of persons and places in the various Slavonic regions of Europe, such as Eastern Germany, Poland, Austria, Russia, Servia, &c. Several instances have already occurred in this work, and more will immediately follow. We may recall two conspicuous examples—*Beli-Tsar* (Gr. *Belisarios*), 'the white prince,' and *Belgrade*, 'the white fortress.'

Biel (Fr. *Bienne*), an old town in the Swiss canton of Bern, picturesquely situated at the base of the Jura, to the N. of Lake B., near the mouth of the Suze or Schüss, with manufactures of printed cottons, watches, leather, cigars, and iron-wire. It was founded in the 11th or 12th c., early came under the rule of the Bishops of Basel, but allied itself with the Swiss confederacy in 1352, and thereby diminished the power of its ecclesiastical overlords. It was united to France in 1798, but restored on the peace of 1815. The inhabitants of B. speak German, but there is also a French patois. Pop. (1870) 8113. See Blösch's *Geschichte der Stadt B.* (Biel, 1855-56).—**B. Lake** is about 10 miles long and 3 broad, is 1419 feet above the sea, and has a depth of 300 feet. It contains the island of St Pierre, where Rousseau resided in 1765; receives the surplus waters of Lake Neuchâtel by the Thiele, and then discharges its own waters by the same river; flows N.W. and joins the Aar, at the distance from Lake B. of 5 miles.

Biela's Comet, discovered by Biela, an Austrian officer, February 28, 1826, has a period of 6.61 years. It appeared, according to prediction, in the years 1832, 1839, 1845, and 1852. In the years 1859 and 1866 it was not observed as expected, but reappeared in 1872 at a time of meteoric display.

Bielfeld, the chief town of a district of the same name, province of Westphalia, Prussia, on the Lutter, 52 miles S.W. of Hanover, with which it is connected by rail. It is one of the chief places in Germany for flax-spinning and linen manufacture, and among its other industrial products are silk, velvet, tobacco, glass, asphalt, cement, machinery, cast-iron wares, and leather. The old walls and ditch of B. have been converted into promenades. On the outskirts of the town is the castle of Sparrenberg, built by the family of Ravensberg in 1545, and now used as a prison. Pop. (1875) 26,574.

Bielew, a town of Russia, government of Tula, on the Oka, 150 miles S.S.W. of Moscow. It has 19 churches and 2 monasteries. The chief manufactures are soap, leather, oil, and sailcloth. But the most important industry of the inhabitants is a pedlar-trade with the poor and a sutler-trade with the soldiers. In the remotest parts of the vast empire, Siberia, Caucasus, Georgia, &c., numbers of the Bielevese are to be found engaged in lucrative huckstering. Pop. (1867) 8123. The Empress Elizabeth, widow of Alexander I., died here May 1826, on her return from Taganrog to St Petersburg.

Bielitz (Pol. *Bielsk*, 'white town'), a town in Austrian Silesia, at the N.W. foot of the Carpathians, on the Biala, opposite the Galician town of Biala, with an extensive woollen and kerseymere trade. It has 18 wool factories, with manufactures of linen, machinery, carriages, &c., and is a great emporium for the salt produce of Galicia. The old castle of the Princes Sulkowsky, to whom B. belongs, is situated here. Pop. (1869) 10,721.

Biella, the capital of province Novara, N. Italy, at the junction of the Cervo and Aurenza, 39 miles N.E. of Turin by rail, with manufactures of woollens, hats, paper, &c. It is the seat of a bishop, and has many churches. Pop. 8362. Near it is the village of Oropa, with its famous monastery *Madonna del Monte*.

Bielo-Ozero (the 'white lake,' so called from its white clay basin), belongs to the government of Nevgorod, Russia, and is 25 miles long by 20 broad. The Sheksna river conveys its waters to the Volga; and the Onega, Sukona, and Dwina are connected with it by canals.—**B. Ozerish**, on the southern shore, is a small town of 4467 inhabitants (1867), and trades in cattle, corn, pitch, and candles.

Biel'opol, an active trading town in the government of Kharkov, Russia, 106 miles N.W. of the city of Kharkov. Pop. (1867) 10,500.

Bielshöhle, a singular cavern in the Harz Mountains, on the right bank of the Bode, near Rübeland, Duchy of Brunswick. It was discovered in 1762, and consists of eleven compartments, abounding in curiously formed stalactites.

Bielak, a town of western Russia, government of Wilna, 23 miles S. of the town of Bialystok, lies in a very fertile district, watered by the Narev and Nurzek. Pop. (1867) 3985.

Bienne. See BIEL.

Bienn'ials, plants which do not flower the first season of their growth, but flower, bear fruit, and die away the second season, such as the turnip, carrot, wallflower, parsley, &c. Under exceptional circumstances of early sowing, heat, &c., plants which are naturally B. will flower and fruit during the first season. In such cases they become annuals, and die the same season. Brown's *Manual*, p. 295.

Biervliet, a fortified town on an islet of the same name, belongs to the province of Zeeland, Netherlands, and lies 16 miles N. of Ghent. In 1377 the islet of B. was formed by an inundation, which separated it from the mainland and which submerged

19 villages. William Beukelzoon (q. v.), the inventor of herring-curing, was born here. Pop. about 5000.

Biesbosch (i.e., 'rush-bed'), a 'coast-lake' of morass in Holland, near the mouth of the Maas, having an area of some 60 sq. miles, containing numberless small islands, and communicating with the German Ocean by the Hollandsdiep and Haringsvliet. It was formed (November 18, 1421) by the Maas in flood forcing a direct course towards the sea, on which occasion 72 villages, with 100,000 persons, were swept away. The B. is now crossed by the railway from Rotterdam to Antwerp.

Biffin. See APPLE.

Big'a, properly *Bigae*, the Latin name for a chariot and pair, the two horses being yoked abreast. The chariot was two-wheeled, open behind, and sloping gradually upwards to the front, which was closed in. The occupant and the driver both stood.

Bigamy is the crime of going through the marriage ceremony during the legal subsistence of a marriage previously entered into. The crime is equal in degree on the part of a man and of a woman. By 24 and 25 Vict., c. 100, if any person, being married, shall feign to marry another person during the life of the former husband or wife, whether the feigned marriage shall have taken place in England, Ireland, or elsewhere, he or she shall be guilty of *felony*, and subject to penal servitude. But the penalty shall not be incurred on account of any second marriage contracted out of England or Ireland by any one not being a subject of her Majesty; nor by any person marrying a second time whose husband or wife shall have been continually absent for seven years, and not known to have been living within that time; nor by any person who at the time of such second marriage shall have been divorced; or by any person whose former marriage shall have been declared void by the sentence of a court of competent jurisdiction. Strictly speaking, no one of course can remarry during the subsistence of a previous marriage. He or she can but go through the form or ceremony of so doing. The essence of the crime consists in the fraud involved; but even where there is no fraudulent intention, and the crime is committed through legal ignorance, it is nevertheless one which the law severely punishes, and properly so, because the ignorance of the offender will not mitigate the injury to the victim. Nice questions have arisen between the law of England and that of Scotland regarding B., as they have done on many other points relating to marriage. It was decided in England, in the celebrated case of *Lolley*, that a decree of divorce by a Scotch court in favour of a born Englishman domiciled in Scotland was not operative in England. *Lolley* and his wife had domiciled themselves in Scotland for the purpose of obtaining a divorce, which being got, the former returned to England, where he remarried. He was at once indicted for B., found guilty, and sentenced to seven years transportation. A good deal of difference of opinion existed among eminent English lawyers as to the soundness of this decision. It was, however, generally held to be sound; which being so, it is not for us to question the fact. The decision was given in 1812. It is very doubtful if it would now be sustained, especially having regard to the exception in the Act above quoted, which provides that the penalty shall not apply to any one who at the time of remarrying shall have been divorced. Not only the bigamist, but every one advising, aiding, or abetting the offender, is held equally guilty with the offender himself. Accessories before and after the fact are also severely punishable.

Bigg. See BARLEY.

Big'horn (*Ovis montana*), a species of sheep, the only species indigenous to the New World, inhabiting the Rocky Mountains from their termination in latitude 68° to 40°. The males of this species possess horns of enormous size, and hence the popular name of these animals, which collect in flocks numbering from five to thirty individuals. They are wild and untamable in habits.

Big Horn River, the largest tributary of the Yellowstone, which again is the greatest affluent of the Missouri, rises near Fremont's Peak in the Rocky Mountains, and waters Wyoming and Montana for a course of 400 miles, part of which is navigable.

Bight, a noun derived from the old English verb *bigan*, to 'bow' or 'bend,' and still in use among sailors to denote a coil of a rope. It is also applied in geography (though here also the term is doubtless of nautical origin) to denote a bay of the sea, as the B. of Benin, the B. of Biafra, &c., on the W. coast of Africa. B. and bay (originally *bige*) are essentially the same word. Another form is the Lowland Sc. *bucht*.

Bignoniaceæ, the trumpet-flower order, a natural order of Dicotyledonous plants, mostly trees, or climbing or twining shrubby plants, with large and showy flowers, and opposite, simple, or most pinnately-compound leaves. The order has about 46 genera and 460 species, most of which are tropical plants. With the exception of being cultivated for their beautiful flowers, the order is of little importance. From the leaves of *Bignonia chica* the S. American Indians make *chica* for painting their bodies and arrows. In India an oil is obtained from the wood of *B. xylocarpa*. The woods of several species are used in Brazil and Jamaica—e.g., *B. leucoxyton*, which is sometimes sold as ebony. The trumpet creepers (*Tecoma*) are often astringent, and the roots of *Jacaranda Bahamensis* is employed as an anthelmintic in Panama.

Big Sandy Creek, a navigable river of the United States, rises in the Pallachians, and flows N. for some distance in two branches, forming the boundary between Kentucky and Virginia, and joining the Ohio after a course of 150 miles.

Bihac, a strongly fortified town in the N.W. angle of Turkish Croatia, on the Unna, near the Austrian military frontier. It was often besieged during the Turkish wars. Pop. (1869) 4000.

Bijanaghur ('city of triumph'), a ruined city of India, province of Madras, on the Jumbudra, 40 miles N.W. of Bellary. It was for two centuries the capital of a Hindu sovereignty, and has remains of granite palaces and temples. In 1564 it was plundered and destroyed by the Mohammedans of the Deccan.

Bijawur, a town and mediatised state in the Bundelkhand, Central India. The town is in a mountainous tract, 140 miles S.W. of Allahabad. Pop. estimated at 6000. The state has an area of 920 sq. miles, a pop. of 90,000, and a revenue of £35,000. It is bound to maintain a force of 100 cavalry and 1300 infantry.

Bijnur, a town and district in the Rohilkhand division, N.W. Province, British India. The town is on the left bank of the Ganges, 75 miles S.W. of Delhi, with a pop. in 1872 of 12,566. The district has an area of 1884 sq. miles, and a pop. (1872) of 737,152. Its produce consists chiefly of cotton, wheat, and sugar-cane.

Bikanir, the capital of the Rajput state of the same name, India, 240 miles W.S.W. of Delhi. Pop. (1874) 35,768, chiefly Jain traders and Brahmans. The town has a handsome appearance, many of the houses having beautiful carved façades. In the centre is the fort and palace, strongly fortified. There are manufactures of blankets, &c. The potters and stonecutters of B. are celebrated. The state was founded by Bika Singh, a son of the Jodhpur chief, in the 16th c., and is still independent, the treaty of friendship with the British Government, March 9, 1818, exacting no tribute, but securing the freedom of transit for the trade with Central Asia, which now, however, goes by the Multan route. B. rose to importance as a principality of the Mogul Empire, and received privileges and additional territory from the Emperor Akbar. At the time of the Mutiny, Sirdar Singh, the present ruler, fought against the rebels of Hansi and Hisar, and protected European fugitives, for which services he received a grant of 41 villages. The present (1875) minister of state is Pundit Munphul, C.S.I., the celebrated Central Asian traveller. The revenue of B. is £60,000. Area, 17,676 sq. miles; pop. (1874) about 300,000. See Malletson's *Native States of India* (Lond. 1875).

Bikh. See ACONITUM.

Bil'ander, or **Bilandre**, a kind of merchant-ship not often seen now. It has two masts, and is distinguished by the shape and arrangement of its mainsail.

Bilbao (Basque, 'Under the hill'), a Spanish seaport, and capital of the province of Biscay, on the Nervion, 8 miles above

Portugaleta, situated at its mouth, and 45 miles W. of San Sebastian. It is connected by railway with Tudela, in the valley of the Ebro. The new town lies picturesquely along terraced slopes on the right bank of the river, and is connected with the older part (*B. la Vieja*) on the left bank by a stone, a chain, and an iron bridge. It has fine promenades, good churches, a theatre, and a school of navigation. B. is an important commercial centre, and is the principal port of N. Spain, the larger vessels anchoring at Portugaleta, where there are large shipbuilding yards. B. itself has extensive iron foundries, with manufactures of sailcloth, glass, paper, leather, hats, earthenware. Its great export is wool; but it also sends to Central and Northern Europe chestnuts, oil, wine, &c. On the other hand, a large part of Northern Spain is supplied with foreign productions, machinery, hardware, cotton and woollen goods, colonial produce, &c., through the port of B. Pop. 18,800. B. was founded in 1300, under the name of *Belvaio*, by a knight of Castile, Don Pedro Lopez de Haro; rose rapidly, but suffered severely in the French wars. It was taken by the French 19th July 1795, and again, 26th September and 1st November 1808. During the Carlist struggles it has often been besieged; the latest instance was a most destructive bombardment in the spring of 1875, when it was relieved (May 2) by the army of the north under Generals Serrano and Concha.

Bilberry. See WHORTLEBERRY.

Bil'bilis, a Celtiberian city of Spain, the birthplace of the poet Martial, and famous in Roman times for its steel blades, tempered in the water of the Salo. Its site is at Bambola, near the modern town of Calatayud, which is built in great part out of the ruins of B.

Bil'boes (from Bilbao, where they were first fabricated), long bars of iron, with shackles sliding on them, into which are inserted the ankles of sailors who have been sentenced to be put in irons.

Bil'cock. See RAIL.

Bil'derdijk, Willem, a once famous Dutch author, born at Amsterdam, 7th September 1756, studied law and philology at Leyden and cultivated poetry while practising as an advocate at the Hague. During the French occupation he was for some time in Brunswick and England, lecturing in the latter place vehemently against the French language. Louis Bonaparte, King of Holland, took him into favour in 1806, and made him a president of the new Institute at Amsterdam. On the re-union of Holland to France, B. lost this support, but on the deliverance of his country (1814) he recovered his position at the Institute. He died at Haarlem, 18th December 1831. B. was remarkable in poetry for the skill of his imitations and translations of the Greek idyllists, of Sophocles, Dante, Corneille, Delille, Chaucer. He even tried an epic, *De Ondergang der eerste Wereld* ('The Destruction of the First World'). He was a patriotic adherent of the house of Orange, savagely criticising both German and French literature, and vindicating the rhyming capabilities of his own language. Among his most important didactic poems are *Buiten Leven* (Amst. 1803); *De Ziekten der Geleerden* ('The Maladies of Scholars,' Amst. 1807); and *De Mensch* (1808). He also wrote in prose a treatise on geology, based on De Saussure, a history of Holland in 10 vols., and several essays on grammar and philology. In old age his mind was embittered and half upset. Thus the *Echo from the Rock* (1824) is a tirade against most modern improvements. A collected edition of his poems (*Dichtwerken*), in 16 vols., was published at Haarlem, 1857-60. His second wife, Katharine Wilhelmine B., née Schweickhardt (born 1777, died 1830), was also a poetess of considerable merit. See Da Costa, *Overzicht van het Leven en de Werken van B.* (Amst. 1844), and *B. en da Costa* (Amst. 1862).

Bile is a greenish-yellow fluid, somewhat viscid, especially that portion of it contained in the gall-bladder. It has a bitter taste, a peculiar nauseous smell, and an alkaline reaction. It is heavier than water, its specific gravity being from 1026 to 1030; water being 1000. It is secreted in the cells of the liver, and flows along the hepatic duct till its union with the cystic duct, the duct leading to the Gall-bladder (q. v.), and then along the 'common B.-duct,' and is poured into the upper part of the small intestine. The common B.-duct in man enters the bowel

obliquely about three or four inches below the stomach. This duct is somewhat constricted at its opening into the Duodenum (q. v.), and when this opening is closed by contraction of the muscular coats of the bowel or otherwise, the B. flows along the cystic duct into the gall-bladder, and is there stored up. The B. is constantly being secreted by the liver, but in much greater quantity during meals. Berzelius gives the chemical composition of the B. as follows in 1000 parts:—

Water,	904.4
Biliary fat and colouring matter,	80.0
Mucus,	3.0
Earthy salts,	12.6

B. contains two acids, glyco-cholic and tauro-cholic. The latter contains sulphur. These two acids are in combination with sodium and potassium, and so form a soap, giving to B. its saponaceous character. Five colouring matters have been detected in B. The most important of these are bilirubin and biliverdin. The former is the chief pigment contained in human B., and is of a pure red colour. The latter is the chief colouring matter in the B. of herbivorous animals, and is of a green colour. By means of the action of nitric acid on these pigments, we are enabled to detect the presence of B. in urine and other substances. The fatty portion of B. is composed to a great extent of Cholestrine (q. v.) united with fatty acids. Iron and copper are both found in B. The quantity of B. secreted has been variously estimated, but it is generally believed that in man it is fully 3 lbs. daily.

The functions of B. are most important. The elements of B. are secreted from the blood by the liver, and the blood is thus purified of certain constituents which would render it deleterious. The B., after being poured into the bowel, assists in the process of digestion. How it does this is still a matter of doubt, but it is believed to assist in turning the chyme into chyle. It is poured into the alimentary canal in greater quantity during the process of digestion than during fasting. A portion of B. is carried along the alimentary canal, and is excreted with the feces. This is specially noticeable in the case of the colouring matter of B. The greater portion of B. is re-absorbed into the blood, and passes off in the lungs as carbonic acid and water, on account of the carbon and hydrogen of the B. uniting with oxygen. B. has the property of arresting the process of digestion, and on account of this property, when B. by regurgitation or otherwise finds its way into the stomach, it materially interferes with digestion, producing nausea, vomiting, and that condition of the system termed biliousness.

When B. is secreted in greater amount than can be poured into the bowel, or when through obstruction of the common B.-duct it is prevented from entering into the bowel, it is again re-absorbed into the blood, and produces that disease called jaundice (q. v.), in which the skin and conjunctiva assume a yellow colour, due to the colouring matter of B. By the solidification of the cholestrine gall-stones are formed, and the passage of these along the B.-ducts gives rise to acute pain. See GALL-STONES.

Bilge, that portion of the bottom of a ship contiguous to the keel and on both sides of it. A ship when aground usually rests on the keel and one B.

Bilge-ways, timbers used for launching a ship. See LAUNCH.

Biliary Calculus. See CALCULUS.

Bilim'ba. See CARAMBOLA.

Bilin', a small town in Bohemia, on the river Biela, about 3 miles from the baths of Teplitz, is chiefly celebrated for its acid springs, and for the remarkable precipitous mount in, called Březina-Berg, in its vicinity. B. has a trade in Glauber-salts, magnesia, cloth, coal, beetroot, sugar, and fruit. Pop. 4300.

Bilious Fever. See TYPHOID FEVER.

Bill, the term applied in zoology to the beak of birds. The B. consists of an upper and a lower *mandible*, which consist essentially of prolongations of the facial bones. The *inter-maxillary bones* constitute the chief portion of the edge of the upper jaw, whilst the upper jaw itself in birds is formed by the *premaxilla*, or front portion of the *maxillary* bone. The lower

jaw, or *mandible* proper, consists, in birds, of numerous separate pieces, which become ossified together in the adult to form a single bone. No teeth are developed in the jaws of any bird, although the horny membranes which invest the jaws may present processes analogous, but not homologous, with dental structures. The *form* of the B. varies greatly throughout the class of birds, and is adapted to the different habits of the included members. Thus, in the birds of prey (*Raptorus*), the B. is arched, and of powerful make; in the parrots it is curved, and adapted for aiding these birds in climbing, and in the cracking of hard fruits, &c.; in the insect-eaters (e.g., goatsuckers, swallows, &c.) the B. is short, and the gape wide, and provided with bristles adapted for the detention of the insect-prey which these birds pursue on the wing; in many swimming-birds the B. is broad, and provided with sensitive *lamina* or plates, fitted for straining the food from among the mud in which these birds grope; whilst many other adaptations of the structure of the beak to the wants of its possessors might be cited, and are referred to under the articles relating to the different birds. The term *cere* is applied to the sensitive portion at the base of the upper mandible, which may be naked or feathered, and in which the nostrils frequently open. This cere has been supposed to be of use as an organ of touch. The B. is also used by birds to *preen* or dress their feathers with the secretion of the *urophygium*, or *oil-gland*, of the tail; the great mobility of the neck of birds giving to the B. many of the characters of a hand.

Bill, a term applied to an account, and to various kinds of formal writings connected with state, legal, and mercantile affairs and procedure. See the following articles under this word:—

B. of Adventure is a writing given by a merchant, declaring that goods shipped by him belong to some one else, to whom he undertakes to account for the results of the adventure.

B. of Attainder, and *B. of Pains and Penalties*, are bills or measures proposed to be enacted by the Legislature, criminally condemnatory of an individual. The Legislature being legally omnipotent, it has frequently in the history of England passed a B. of A. against an individual, on evidence which would have been quite inadequate to establish guilt in a court of justice. Instances have even occurred of persons being so attainted without their being heard in their defence. Under the Tudors, this method of procuring condemnation of men who had become obnoxious to the monarch, or who were suspected of treason, was frequently had recourse to. It rarely was so under the Stuarts; but a noteworthy instance, in their time, was the B. of A. in the reign of Charles I. by whose enactment the Earl of Strafford was beheaded in 1641. In 1820 the trial of Queen Caroline before the House of Lords took place under a B. of P. and P. Like other bills, those in question can only become law by the unanimous judgment of the Crown, the Lords, and the Commons. See ATTAINDER.

B. in Chancery, or *B. of Complaint*, is the written statement of a plaintiff in the Court of Chancery, under which he seeks equitable redress. The somewhat analogous term in Scotch law is *Condescence* (q. v.). The B. of C. sets forth the circumstances of the case. It must be signed by counsel. It must not contain any matter impertinent. It must be printed, and duly served on the defendant. The B. may be dismissed by *demurrer*—that is, by the court finding that, even if the averments be true, the plaintiff is not entitled to relief from the court. Otherwise, an answer is ordered, and the case proceeds.

B. of Costs is the attorney or solicitor's account against his client. These bills are submitted to the Masters of the respective courts, who make such deductions as they think reasonable, and the remaining charges are certified and called the *Master's allocation*. In Scotland, the solicitor's B. of C., there called *expenses*, is taxable by the Auditor of the Court of Session (q. v.). See COSTS, EXPENSES. In some kinds of transactions in England and in Scotland the law-agent is paid by commission—that is, by a percentage on the value of a transaction. This mode of payment is adopted in the case of loans and sales. In 1873 in England, the council of the Incorporated Law Society drew up a scale of these charges, according to which a per cent. is allowed on a loan up to £2000, and for each £1000 thereafter up to £15,000, 1 per cent., after which $\frac{1}{2}$ per cent. On a sale, the charge is 3 per cent. up to £1000, between which and £5000 it is 2 per cent.; between £5000 and £50,000 it is 1 per cent., thereafter $\frac{1}{2}$ per cent.

B., True.—In criminal law, a B. signifies the indictment of the accused before the grand jury. (See JURY, GRAND.) The jury either 'ignore the B.'—*i.e.*, acquit the prisoner—or find 'a T. B.' against him. In the latter case, he is tried before a petty jury, whose verdict determines his guilt or innocence. See JURY, TRIAL BY.

B. of Exceptions is a statement of objections as ground of appeal (see APPEAL) to the ruling of a judge in a civil case. Counsel can oblige a judge publicly to seal a B. of E., stating the point on which he is supposed to err.

B. of Exchange is a mercantile instrument generally written on a broad, short piece of paper, by which one person orders or requests another to pay a certain sum of money to him, to a third person, or to 'the order' of either, at a specified time. The place of payment is also sometimes specified.

The convenience afforded in commerce by the B. of E. is easily understood. It is valuable especially in two ways,—First, as facilitating transactions on credit; second, as saving time, expense, and risk in transmitting or carrying money. Thus, A supplies goods to B, for which A wishes to be immediately paid; B, on the other hand, wishes credit for four months; so that he may have retailed his goods before paying for them. A then draws a B. on B for the value of the goods, to be paid 'four months after date.' The B. is negotiable; and A gets the value of it, less four months' interest, from his banker or other capitalist; and thus debtor and creditor are accommodated. Again, AM in London owes BN in Glasgow £100, and CP in Glasgow owes AM £100. AM, instead of paying his debt to BN by sending coin or bank notes from London to Glasgow, writes as follows on a piece of duly stamped paper:—

£100.
(Stamp).

London, 1st June 1875.

One month after date ('on demand,' or 'at sight') pay to Mr BN, merchant in Glasgow, or order, one hundred pounds for value received. AM.

Mr CP, Merchant, Glasgow.

He transmits this piece of paper to BN of Glasgow, who receives the amount from CP; who thus discharges his debt to AM of London. Such a simple transaction as this, which we give to show the principle of a B. of E., becomes complicated to suit the convenience of commerce; and as it becomes so, questions arise of the greatest legal nicety.

We have supposed BN to receive payment from CP, but unless the B. be payable 'on demand' or 'at sight,' it will seldom happen that the drawer's creditor receives direct payment from the drawer's debtor. In our first illustration of the convenience of bills, we have shown how this happens. A, we have said, gets the value, less four months' interest, from his banker, or other capitalist. A is then said to have *discounted* his B. In so doing he *endorses* it, that is, he writes his name on the back; by doing which he becomes legally bound for the amount to the discount—*or* endorsee, as he is called—who, when the B. becomes due, is entitled to require payment either from A, the drawer, or from B, the drawee or acceptor. This endorsee may again endorse and discount with some one else, who in his turn becomes the endorsee, and so on; the holder, when payment becomes due, having all the endorsees as securities, as well as the drawer of the B. He who makes or draws the B. is the drawer; he to whom it is addressed is before acceptance the drawee, after acceptance, the acceptor; the person in whose favour it is drawn is the payee, and if he endorses, he is then the endorser, and the person to whom he transfers it is the endorsee. Whoever possesses the B. is the holder.

A B. is either *foreign* or *inland*. It is foreign when the address of drawer or drawee is abroad; it is inland when both reside in the United Kingdom or Channel Islands. A *good* B. must be payable *at all events*. It must not be payable out of a particular fund. It must be drawn for money only; and not stipulate for the performance of any act. It must be duly stamped. Omission of date may render it void. To be negotiable, it must be payable to 'A, or order,' or 'to bearer.'

Acceptance is an engagement to pay the B. It is done by the drawee writing 'accepted' on it, and then signing. It may be inferred in England from collateral circumstances, but not so in Scotland. See ACCEPTANCE. It may also be conditional or partial; for instance, to pay £200 instead of £150. The holder of a B. of E. must present it for payment at the proper

time and place; and his failure to do so, or to give notice of non-payment by the acceptor, exonerates the drawer and endorsers. When a B. becomes due, it is said to *mature*. This is not generally till three days after the date on which it bears to be due. These three days are called 'days of grace.' If not then paid, the holder may proceed to recover by law. This is now done by a speedy process, under the Act 18 and 19 Vict., c. 67. The Act does not extend to Ireland, nor to Scotland, where the payment of a B. may be enforced by a very summary process. Against the drawee and acceptor this process must, however, be begun by protest (*i.e.*, notarial evidence of demand duly made), not later than the last day of grace. Against the acceptor, the protest may be made and recorded any time within six months after the B. has matured. As there are now various mercantile journals which publish the recorded protests of bills of exchange in Scotland, and the similar procedure in England and Ireland, procedure is almost certainly fatal to the mercantile credit of the obligant against whom the protest is made. The holder must, therefore, be very careful not to take this extreme measure without being sure that he is legally entitled to do so. The mere fact that A is a holder of a B. on which B is an obligant, may not justify A in recording protest against B. It may really be that on an accounting A is debtor to B, in which case the protested B. might be held as paid; or there may be many other reasons why the summary procedure would not be held as justified; in which case B. might have ground for an action for damages, so leading A into the expense and trouble of a jury trial. If B thinks himself wronged, his remedy is by writ of summons; in Scotland by note of suspension (see SUSPENSION) in the B. Chamber (q. v.). Suspension is, however, seldom granted without the defender being required to give security for the amount expressed in the B. Even though the note contain an allegation of forgery, security may probably be required. See FORGERY.

By writing the words 'without recourse' after his signature, the endorser of a B. may free himself of liability to the endorsee.

Accommodation B. is a B. drawn for a fictitious debt, for the purpose of raising money by discounting it. A owes B nothing, but he accepts A's B. drawn on him at four months for £100. B discounts this with his banker, and so gets the loan of £100, less the discount, for four months. B probably returns the favour to A; and when the relative obligations fall due, if not convenient to pay them, they are met by drawing fresh bills, which, to avoid exciting suspicion, may be discounted with another bank, or through some different channel from the first. This fraudulent system, fostered by over-speculative banks, has sometimes in our great mercantile towns been carried to an extent that has led to general commercial disaster. There have been many plans for suppressing the system by law, but it has been found impossible to do so, without undue interference with lawful transactions.

Promissory Note is a written obligation by one person to pay a certain sum of money on demand, at sight, or at a specified time after the date of the note, to another, or his order, or to the bearer. It is usually in this form,—

£100.

London, 1st June 1875.

On demand.

At sight.

months after date.

I promise to pay AB one hundred pounds for value received. CD.

The note requires to be duly stamped. It has all the privileges of the other forms of B. of E., and it is under the same rules and laws. See BANK, BANKING, BANK-NOTES, FORGERY.

I. O. U.—These letters are sometimes used for forming an obligation to pay. They are legal evidence of debt; but unless followed by a promise to pay on a particular day, they do not constitute a promissory note.

B., Exchequer. See EXCHEQUER BILL.

B. of Health is a certificate from the consul, or other proper officer, given to the master of a ship on sailing from a port suspected of infectious disease. A *clean* B. certifies that at time of sailing no such disease was known to be there. A *suspected* B. indicates that there were credible rumours that such disease had appeared. A *foul* B. implies that it actually had appeared.

B. of Indemnity. See (under ACT) Act of Indemnity.

B. of Lading.—This is a very important mercantile document. It is an acknowledgment by the master of the shipment of goods,

which it enumerates, on board his ship; and is a written evidence of the agreement for their carriage and delivery, according to the order or consignment of the shipper. It differs from a Charter-party (q. v.) inasmuch as the charter-party only states the terms and conditions of the freightage or carriage; while the B. of L. usually states the quantity, condition, and marks of the merchandise, the names of the shipper, consignee, and master, and the place of departure and destination.

A B. of L. is transferable by endorsement of the shipper; and his endorsement and delivery of the B. for value conveys the absolute right to the goods shipped to the endorsee. Endorsement is either *general* or *special*. The former does not name the consignee, but gives a general direction to the master to deliver the goods to the holder of the B. of L., on their reaching the place of consignment. *Special* endorsement names the consignee. 18 and 19 Vict., c. 111, enlarges the rights and liabilities of the endorser or consignee of a B. of L. See STOPPAGE IN TRANSITU.

Bills of Mortality are abstracts from parish registers showing the deaths periodically. They generally include, also, periodical lists of the births and marriages. It was on the data afforded by these that Sir W. Petter, Dr Halley, Pascal, Dewit, and others founded their calculations respecting the laws of mortality (see MORTALITY, LAW OF, and LIFE, MEAN DURATION OF); but the data were inadequate, both, probably, from being inaccurate, and from not being sufficiently extensive. The London B. of M. were first used in 1562, and from 1603 they have been kept regularly. They are of little value, from the superior data now afforded for practical purposes by the returns of our Registrars-General. See REGISTRATION OF BIRTHS, DEATHS, AND MARRIAGES.

B. in Parliament. See PARLIAMENT.

B. of Rights. See RIGHTS OF THE PEOPLE.

B. of Sale.—This is a contract under hand and seal, by which a man transfers the interest he has in goods to another. The deed is binding against him who executes it, whether granted for adequate value or not; but it may be fraudulent and void against creditors. It may be an Act of Bankruptcy (q. v.). But a B. of S. for adequate consideration, granted with the knowledge and consent of creditors, is valid against them, though unaccompanied by possession. The most important use of a B. of S. is in the transfer of property in ships, which, being held in shares, cannot generally be delivered over on each change of ownership.

The Act 17 and 18 Vict., c. 36, is framed with the view of preventing frauds on creditors by secret B. of S. of personal chattels. In Scotland a valid title to personal chattels can hardly be given so as to defeat creditors without giving possession to the buyer. See DELIVERY. Certainly the landlord's Hypothec (q. v.) cannot otherwise be superseded.

B. of Sight is a writing taken at the custom-house descriptive of a package consigned to a merchant, on his making oath that he is ignorant of its contents. In virtue of the B. of S. the package will be landed and examined in presence of the importer and officers of the customs. A perfect entry must then be made, and duties paid according to contents.

B. of Store is a licence granted by the custom-house to merchants to carry provisions and stores required for a voyage free of duty.

B. of Victualling.—A list of victuals and stores required on a long voyage is made up by the master of a ship on leaving a British port, and submitted to the custom-house authorities. On their approval, stores are shipped accordingly. A list is then made out of all stores on board, which, being signed by the customs, constitutes the B. of V.

B.-Broker, one whose business it is to buy inland and foreign bills on speculation. This business is to be distinguished from that of one who discounts bills. See BILL OF EXCHANGE.

B.-Chamber is a department of the Court of Session (q. v.) in Scotland, analogous to that of Judges' Chambers (q. v.) in England. The business of the B.-C. consists in the disposal of all matters in whose initial stage judicial authority is required; such as an application for interdict. The court of the B.-C. is held by one of the Lords Ordinary, called the 'Lord Ordinary on the bills.' During the session the duty is taken, by the junior Lord Ordinary. During vacation it is taken by the six judges of the court who are not criminal judges.

Billardiera, a genus of climbing Australian plants of the natural order Pittosporaceae (q. v.), colonially known as 'apple-

berry trees.' Though possessing a resinous aroma and sour taste, and containing many hard seeds, the fruit of *B. mutabilis* is eaten. *B. longiflora* is cultivated as a greenhouse plant in Britain for the sake of its profusion of flowers and blue berries. The genus is named after Labillardiere, a French botanist attached to D'Entrecasteaux's expedition.

Billaud-Varenne, Jean Nicolas, 'the execrable citizen,' born at Rochelle, 23d April 1756. B. studied in the Oratory, and was for some years Prefect of study at Juilly College. Coming to Paris in 1785, he became an advocate, and in 1789 published an anonymous essay on the despotism of French ministers (*Despotisme des Ministres de France*). Vice-president of the Jacobin Club, he called for 'primary' assemblies of the people in every district; urged the destruction of the king, as a member of the Committee of Public Safety and of the Convention; assisted Danton at the September massacres; took the king's letter to General Dumouriez, and drew up the indictment of the king. In 1793 he denounced both the executive council and the Girondists, and turned against Robespierre, whom he succeeded as president. Accused in his turn as a Terrorist by Lecointre and Legendre in 1794, he was ultimately banished to Cayenne with Barere, Vadier, D'Herbois, &c. The last years of his life were spent in Hayti. He died at Port-au-Prince, 3d June 1819. Other books by B. are *Le Dernier Coup* (Lond. 1789), *Le Peintre Politique* (1789), *Acéphalocratie* (1791), or federal government. He excelled in savage attack.

Billbergia (*B. tinctoria*), a beautifully-flowered genus of Bromeliaceae (q. v.), from the roots of which a colouring material is got in Brazil.

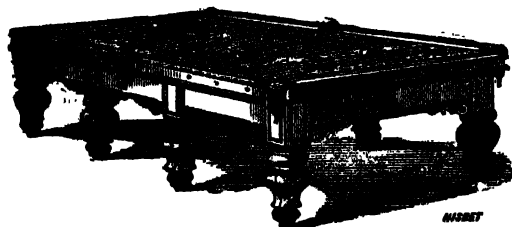
Bill'et, in architecture, is a Norman ornament formed by notching out a moulding, generally a round one, so that it resembles a row of separate billets of wood. In heraldry, B. is a small oblong figure, which may be of any tincture. Whether it represents a brick or a love-letter has been a matter of heraldic dispute.

Bill'eting, a term applied to the feeding and lodging of soldiers when not in camp or barrack. In towns unprovided with barracks this burden is sorely felt, and has always given rise to dissatisfaction and complaint. Prior to 1689 there was no ascertained system for the lodging and maintenance of soldiers in such towns, and there was room for the exercise of caprice and oppression, an unsatisfactory state of matters, which the Mutiny Act of that year attempted to remedy. It intrusted the B. of soldiers on the inhabitants to the discretion of the chief magistrate, whose local knowledge enabled him to distribute the burden with approximate fairness. No change was made by Parliament till 1745, when the burden of B. soldiers was restricted to certain traders, a relief not extended to Scotland till 1857. In 1858 a committee of the House of Commons reported on the hardships and inequalities of the system; but practically the provisions of the Act of 1745 are still in force, with only slight modifications.

All keepers of inns, livery-stables, alehouses, victualling-houses, retail wine-sellers, and dram-sellers are obliged to receive the soldiers billeted on them; but they can claim relief, by complaint to a justice, on proving that, in comparison with their neighbours, the number so billeted is unduly large. By 5 Will. IV., c. 6, persons holding canteens, distillers, shopkeepers whose principal dealing is not in spirits, keepers of taverns only, being free of the Vintners' Company in London, are exempt from receiving the military; and in and near London there are special regulations affecting the B. of the Guards. The person on whom soldiers are quartered must furnish each with one hot meal per day, consisting of meat, bread, and vegetables, with two pints of small beer, vinegar, and salt, for which tenpence is allowed; and innkeepers must provide the military, when stationary, with fire, candles, vinegar, salt, and cooking utensils, for a halfpenny a day. The regulation allowance for hay and straw for a horse is tenpence. These disbursements are made by the regimental paymaster. The term B. is derived from Fr. *billet*, a diminutive of the Low Lat. *billa*, Class. Lat. *bulia*, a small piece of paper or ticket, prepared according to the rules of the Act, one of which is delivered to each soldier, and is his warrant for claiming food and lodging.

Billiards (Fr. *billard*, from *bille*, a ball, hence *billarder*, to strike a ball twice; Ital. *bigliardo* or *trucco*), a beautiful and

scientific game, played with ivory balls on a specially constructed table, and supposed to be of either Italian or French invention. From France, at all events, it found its way to England, where it was known in the 16th c., as appears from a passage in Shakespeare's *Antony and Cleopatra*, act ii. sc. v., in which B. is represented as a pastime of the amorous queen of Egypt (!). Little is known of the progress of B. in England, but it is only in comparatively recent years, and after great improvements in the game itself, that it has come to be so universally popular.



Billiards.

The modern billiard-table is rectangular in shape, stands 3 feet high, is generally about 12 feet long, by 6 feet $1\frac{1}{2}$ inches wide, and usually costs from £80 to £150, though a very good table may be had for less even than the lower of these sums. The first-class table is made of mahogany, and has an entire weight of from 20 to 25 cwt. It has a perfectly level surface, formed of the finest slate of Bangor or Penrhyn, and covered with green cloth; and is surrounded by a ledge, the inner sides of which, called 'cushions,' are padded with 'native' or vulcanised india-rubber to make the balls rebound. With good cushions, a ball struck moderately hard will traverse the table three or four times; on 'fast' tables, as many as eight passages may be made. Round the table, at each corner and at the centre point of each of its longer sides, are placed the six holes or pockets, with nets to catch the balls. About 2 feet 5 inches from one end, a line is drawn across the table, the space within which is known as 'bault,' and from the centre of this line is described a semicircle, 18 inches in diameter, from within which the play begins. At the other end of the table, 15 inches from the cushion, a spot indicates where the red ball is to be placed at the beginning of the game. The cue is a straight rod of lance, ash, box, or Brazil wood, about 5 feet long, tapering towards the extremity, which is tipped with leather, and which requires to be chalked occasionally in playing. The regular billiard-ball is made of the finest African ivory, is perfectly spherical, and is $2\frac{1}{4}$ inches in diameter. One of the balls is red, having been dyed with vermillion; the other two are white, distinguished from each other by one having a small black spot. Among the other accessories of the game, not calling for special description, are the long cues, butts, rests, maces, and the marking-board, in its improved form a miracle of ingenuity.

In playing, the cue is held in the right hand, and is steadied, at about a foot from the tip, on a 'bridge' formed by the thumb and forefinger of the left hand, which rests on the table. In the ordinary billiard game the objects of the player are twofold: first, to 'cannon'—i.e., to touch both of the other balls with his own at one stroke; second, to make a 'hazard,' by either holing his adversary's ball or the red one, or by pocketing his own, off either of the other balls. The former is called a 'winning,' and the latter a 'losing' hazard; but these terms, derived from the old game at B., no longer apply in their strict sense, as is seen from the fact that the winning hazard now is the less advantageous. The 'points' of the game are, 2 for a cannon, 2 for a white hazard, 3 for a red hazard, 1 'away' (or to the adversary) for a miss, and 3 'away' for a 'cob' (coup)—i.e., going into a pocket or off the table without striking another ball. A game was formerly limited to 21, but now oftener extends to 50, 63, 84, 100, or 1000. Two, three, or four persons may play at the billiard game; two or four being the usual number. The common game in France, and indeed all over the Continent, consists altogether of cannons, and is played on a table without pockets.

There are many other games played on the billiard-table, of which the chief is the somewhat mercenary 'pool,' a game con-

sisting entirely of winning hazard. It thus closely resembles the old game of B. before the introduction of the red ball, and can be played by as many as fourteen persons (formerly limited to twelve), each contributing his stake to the 'pool.' The players receive each a ball, and start with three chances, or 'lives,' and every time a ball is holed, the owner of the ball pays a sum previously agreed upon to the player, and loses a 'life'; when this happens three times he retires from the game. The person who first loses all his lives can 'star,'—i.e., purchase the smallest number of lives still existing, by renewing his stake to the pool; if he does not, the privilege extends in rotation to the other players, excepting always the last two. He who keeps his ball longest on the table wins the pool. The game is to hole the ball of the previous player, and, when successful, to play at the nearest ball. The balls are easily distinguished by being of various colours. The 'pyramid' game, which is also popular, is played with fifteen red balls and one white, the red balls being placed together, in the form of a triangle or pyramid, at spot, and the game being to hole them, subject to the special rules.

Captain Crawley has called B. an excellent form of 'indoor athletics,' but it is something more. The principal qualifications of the expert player at B. are the power of dynamical calculation, presence of mind, a steady hand, and a sure eye. He has to estimate the 'strength' of his stroke, and the elasticity of the cushions, to follow instinctively the angles of incidence and reflection, to allow exactly for the disturbing influence of the 'side' imparted by striking his ball in a particular spot, and to be able to leave the three balls near any given position after a variety of impacts and rebounds. Amongst the best players in England of late years may be mentioned the late Earl of Eglinton, Colonel Munday, Mr Roberts (senior), 'young' Roberts, Mr William Cook, and Mr Bennett. Mr Cook was champion for many years, and astonished his admirers by a score of '752 up' in a match with Bennett at St James's Hall in 1871. Mr Roberts, junior, has at various times performed such wonders with his red winning-hazard at the lower end of the table, that his name is identified with the particular stroke. The best billiard-tables are made by the celebrated firm of Messrs Burroughes & Watts, London, and by Messrs Morison & Co. of Edinburgh. See Moley, *Unterricht im Billardspiel* (Leips. 1841); Coriolis, *Théorie M'ématique des Effets de Jeu de Billard* (Par. 1835), and the well-known works of Captain Crawley (Lond. 1866) and Joseph Bennett (1873).

Billig, a noble family of Old Saxony, and from 961 to 1106 the ruling dynasty in the Duchy of Saxony, which under it attained great territorial strength and independence. The first Duke was **Hermann B.**, originally perhaps a simple gentleman, but raised by the Emperor, Otto I., through a succession of dignities to the governorship of Saxony. B. was celebrated in his time for his valour, boldness, sense of justice, and loyalty. He died at Quedlinburg, 27th March 973. His successors in regular order were Bernhard I., died 9th February 1011; Bernhard II., died 29th June 1059; Ordulf, died 28th March 1071; and Magnus, died 23d August 1106, with whom the male line became extinct, when the Duchy reverted to the emperors. The first traditions of the Billings are mythical rather than historical, but it is not improbable that the name was originally that of an old Teutonic clan or tribe, some of whose members may have been among the Low German adventurers who conquered Britain and made it England. The conjecture, if accepted, would historically explain such names as Billingsgate, Billingshurst, Billington, Billingley, &c.—viz., the homes or settlements of the Billings.

Billingsgate, the old port of London, was opened in 1588 as a landing-place for provisions, made a free market in 1699, and is now a wharf and wholesale fish-market. Salmon and eels are sold here by weight, other fish by tale, oysters and small shell-fish by measure. The market opens daily at 5 A.M., and mackerel are allowed to be sold on Sunday. The market was extended and improved in 1849, and a new one was erected in 1852. From the unsophisticated language of the dealers in this market, B. has come to be synonymous with ribaldry or foul language.

Billington, **Elizabeth** (né Weichsel), born in London, 1769, was one of the most beautiful women and charming singers of her day. Her voice was a soprano, of wonderful compass and quality. After singing with extraordinary success in the chief cities of Italy, Milan, Venice, Leghorn, Genoa, Padua,

Florence, and Naples, she returned to London, where she was so popular, that in 1801 she received from Covent Garden and Drury Lane theatres the (for that time) extraordinary salary of £4000 for six months,—to sing at the two houses alternately. One regrets to add that her private life was a succession of scandals. B. withdrew from the stage in 1809, and died at her villa near Venice, 25th August 1818.

Billiton, one of the Dutch islands in the E. Indies, to the S.W. of Borneo, from which it is separated by Carameta or B. Passage. It exports iron and timber. Area, 1150 sq. miles; pop. 15,000.

Billom, an old town in the department of Puy-de-Dôme, France, 65 miles W. of Lyon, with some manufactures of earthenware, thread, cloth, serge, and embroidered work. It was formerly a place of importance, and had a university, founded in 1455, but abolished on the suppression of the Jesuits in 1764. Its church of Saint Cerneuf, and the ruins of some old castles, are noticeable. Pop. (1872) 3531.

Billon, a French word, traceable as far back as the 13th c., but of uncertain derivation, used in coinage to denote an alloy of silver and copper, in which the latter predominates. Examples of B. are the Prussian 2½ *groschen*, the N. German *silver* or *new groschen*, the S. German 6 or 3 *Kreuzer pieces*, and, speaking generally, most small silver coins. In France the word is more frequently applied to small copper coins.

Bilma, a town in E. Sahara, Africa, the capital of the Tibbu country, on the caravan route between Fezzan and Bornu, with considerable salt trade. It lies 900 feet above the level of the sea, and has a pop. of about 6000.

Bil'aa, or **Bhil'aa**, a strongly fortified town in Bhopal, a feudatory state, Central India, situated on the Betwa, 188 miles S. of Gwalior. Since 1230 B. has changed hands between the Hindus and Moslems several times, and finally became a part of the Mogul empire under Akbar in 1570. Pop. about 30,000. The town is remarkable for its Buddhist monuments, the *B. topes*. In its vicinity is produced the finest tobacco in all India.

Bil'ston, a town in S. Staffordshire, included in the parliamentary borough of Wolverhampton, from which it lies 3 miles to the S.E. It is a great centre of the hardware and lacquer trade, and has extensive iron foundries and smelting-works. There are numerous iron and coal mines in the vicinity. Pop. (1871) 24,188.

Bi'ma, a seaport situated in a deep bay on the N. coast of Sumbawa, one of the Sunda islands, E. of Java. It is the capital of a state of the same name, exports horses, timber, rice, wax, and pistachio nuts, and has a pop. of about 5000.

Bi'mah, or **Bhimah**, a tributary of the Kistnah, rises in the Western Ghâts, in the district of Poona, province of Bombay, at an elevation of more than 3000 feet above the sea-level, and after a S.E. course of fully 300 miles, exclusive of windings, joins the Kistnah, in the southern part of the Nizam's dominions.

Bim'ana, Cuvier's name for the highest order of *Mammalia*, represented by the human species only. This term was applied in contradistinction to the name *Quadrumanus*, which Cuvier gave to the order including the monkeys, apes, and lemurs. The B. thus possessed but two 'hands,' whilst the feet of the monkeys, being also capable of being used as hands, entitled these latter forms to be termed *Quadrumanous*, or 'four-handed.' This arrangement is not strictly correct, as the feet of apes more nearly resemble the feet than the hands of man; and the more approved arrangement is to classify man and the *Quadrumanus* in one order—the *Primates*—and to subdivide this order into distinct subdivisions.

Binary Theory. The B. T. was introduced into chemical science by Dulong, to account for the constitution and properties of *salts* and *acids*. It regards both these classes of substances from a common standpoint, viewing them as compounds of *two* distinct groups or radicals (whence the name of the theory). Acids are compounds of hydrogen and an element, or group of elements, called a *salt radical*; thus—

H(CL) Hydrochloric acid.
H₂(SO₄) Sulphuric acid.
H₃(PO₄) Phosphoric acid.

Salts are compounds of *metals* and *salt radicals*.—

Na(CL) Chloride of sodium (common salt).
Na₂(SO₄) Sulphate of soda.
Na₃(PO₄) Normal phosphate of soda.

The chief objection to this theory is that many of the *salt radicals* cannot be isolated. It should be remembered, however, that chemists are unanimous in believing in the existence of many radicals which are only known in a state of combination.

Bin-Bir-Kiliss'i (Arab. the 'thousand and one churches'), a ruined city of great antiquity in the vilayet of Konia, Asia Minor, 40 miles S.E. of Konia (Iconium), supposed to be Lystra, contains the remains of about 40 Byzantine churches, from which it takes its hyperbolical name. Some ruins a few miles to the E. are supposed to mark the site of Derbe.

Bin'che, a walled town of Belgium, in the province of Hainaut, on the Haine, 9½ miles S.E. of Mons, carries on considerable trade in lace, paper, coal, &c.; and has manufactures of leather, cutlery, glass, &c. Pop. about 5500.

Bindraban' (*Brindaban*), a town in the district of Muttra, N.W. Provinces, British India, on the Jumna, 92 miles S. of Delhi, and 40 N.W. of Agra, has an immense number of red stone temples, chiefly dedicated to Krishna. It is much visited by pilgrims, and has ghâts or flights of steps extending for about a mile along the bank of the river. Pop. (1872) 21,500, nearly all Hindus.

Bindweed. See CONVULVULUS.

Bindwrong. See BENTWRONG.

Bing'en (the *Bingium* of Tacitus, and probably the *Vincum* of the Antonine Itinerary), a town in the Grand-Duchy of Hesse-Darmstadt, at the confluence of the Nahe with the Rhine. Pop. (1871) 5936, mostly Roman Catholics. The district is noted for the culture of the vine, and the exquisite Rudesheimer is produced in the neighbourhood. There are manufactures of tobacco, glue, starch, and leather, besides a brisk retail and river trade. The *Bingerloch*, formerly a dangerous rapid in the Rhine, lay below the town; but blasting operations carried on by the Prussian Government in 1834 have entirely removed the danger to the navigation of the river. A tower, the *Mäuseturm*, in the middle of the Rhine, erected, probably about the year 1000, by Willigis, Archbishop of Mainz, as a defence for the district, is celebrated in legend as the scene of the destruction by rats of the hard-hearted Bishop Hatto in 969, the subject of one of Southey's best-known ballads. Restored in 1856, the tower now serves as a beacon, warning ships, by means of a flag, if the Bingerloch is clear. Opposite to B. lies Bingerbrück, a place which has been created by the Rhein-Nahe and the Rhenish Railway, and which is connected with B. both by a stone and an iron bridge. East of the town is the *Rochusberg*, with its church of St Roch (Fr. *Roche*), built in 1666, and restored in 1814.

Bingley, a town in the W. Riding of Yorkshire, 32 miles W.S.W. of York, on a rising ground between the river Aire on the W., and the Leeds and Liverpool Canal on the E. It has manufactures of yarn and paper, and a trade in malt, and is a station on the Midland Railway. Pop. (1871) 6890.

Binn'acle, formerly *bitacle*, a corruption of the Fr. *habitable*, an abode, is the name given on board ship to the case or box containing the compass, and is so situated as to be easy of reference to the steersman.

Binn'ey, Rev. Thomas, D.D., a popular Independent preacher and theologian, was born at Newcastle-upon-Tyne in 1798. He first officiated as a minister in Newport, Isle of Wight, and removed in 1829 to London to the pastorate of the 'King's Weigh-house Chapel,' in Eastcheap. There he laboured with great success (his pulpit eloquence drawing to his church crowds, especially of intelligent young men), and with only one interval of two years, spent in Australia, till he retired, January 1871. B. wrote several religious works, of which *How to Make the Best of Both Worlds* is the most notable, and he was an ardent, although not illiberal, controversialist on the side of Nonconformity. He was the first to introduce chanting into the service of Independent congregations. B. also received from the United States

the degree of D.D., and from the University of Aberdeen that of LL.D. He died February 26, 1874.

Binomial (Lat. *bis*, twice; *nomen* a name), in mathematics, is an algebraical expression consisting of two terms united by the sign either of addition or subtraction, such as $(a + b)$. The B. theorem, discovered and fully stated by Newton, gives the law of expansion of $(a + b)^n$, where n may be any number, integral or fractional, positive or negative.

Binondo, a town in Luzon, one of the Philippine Islands, on the river Pasig, connected by Manila with a stone bridge, 411 feet long. Pop. about 29,000.

Bintang, an island in the E. Indies, at the extremity of the Malay Archipelago, 40 miles S.E. of Singapore. It belongs to the Dutch, and exports much gum, rice, and pepper. Area, 468 sq. miles; pop. about 10,000.

Biobío, the largest river in Chili, rises in the Andes, and flows into the Pacific at Concepcion. It is 180 miles long, and 2 broad at its mouth, and is navigable for small craft almost to its source.

Biography is a species of prose narrative, of which the subject is the life of an individual man or woman. The ideal B. would, therefore, exhibit the gradual development of character, the influence of such external conditions as education, social position, &c., which modify the inherited tendencies, and the extent to which the character has vanquished or has succumbed to these conditions. For these purposes a description of contemporary social life and history would be requisite. We must know among whom the hero lived, what they thought and felt, before we can fix his position as a guide or protector, or even correctly ascertain the strength of his genius by measuring the resistance he overcame, or the forces which helped him. Whether the life be successful or not, whether the character turn out beautiful or disgusting, B. is eminently the field for didactic conclusion, illustrated in the most powerful and picturesque manner. In the hands of many writers, B. becomes more a romance of reality or a series of striking pictures. This is, of course, a legitimate form of art, but it is often accepted in lieu of a scientific estimate of the influence of individual upon general life, which writers of the romantic class are apt to exaggerate. It is also in this last species of B. that the greatest faults are committed, the minutest contemporary circumstances being considered worthy of insertion and discussion, however remote and indirect their connection with the subject. Pure B. is also found in the autobiography, where the author happens to be a man of modesty and common-sense. Goethe and Mill, for instance, although of utterly dissimilar genius, both succeed in throwing a truthful light upon the inner life, but there are so many opportunities for colouring the past with the regrets or the new aspirations of the present, that autobiography is not chiefly valuable as history, which is rather to be found in the diaries and memoirs which record genuine impressions and reflections made on the spot. Quite apart from B. proper stand the historical collections which, professing to give the lives of individual men, use these chiefly as the links in a consecutive history of a period. Such were Lillie's *Mémoires pour servir à l'Histoire Ecclésiastique de 6 premiers Siècles de l'Eglise*. Much of the *Encyclopædia Metropolitana* was written on the principle laid down by Coleridge in the introduction, that the subject of history being the 'nature of man' (not the nature of society), it might be best represented in B. chronologically arranged. In particular departments of history—e.g., international relations or great constitutional controversies—the B. of a statesman or a warrior, a Barneveldt or a Frederick the Great, may be very complete; but it is now generally recognised that history, as the basis of social science, deals with larger questions and greater forces than B. describes. A more useful form of B. is where, as in Vasari's *Lives of the Painters, Sculptors and Architects* (Flor. 1550), Johnson's *Lives of the English Poets* (1781), Lewis' *Biographical History of Philosophy* (1846), the development of a particular art, science, or speculation is traced in a chronological series of lives, or some general conclusions are attempted to be drawn from the successive failures or successes in these lives. A similar plan, only dogmatic, not scientific, in its spirit, is seen in the *Acta Sanctorum* of the Bollandists (1629-1846). Dictionaries of B., although for the most part confining themselves to the B. of the ancients, to facts, and avoiding

criticism and didactics, are extremely useful. Moreri's *Le Grand Dict. Hist. et Crit.* (1673) may be said to be the first of this class. In modern times the French *Biographie Universelle* and the German *Conversations-Lexikon* are the most important. Another class of books, which glance at eminent lives merely to point a moral, can hardly be called B. Such is Fuller's well-known *Worthies*. Although the word B. is said not to be older than the 17th c., the thing was well known in the ancient world. The narratives in the Old Testament concerning the patriarchs and kings do not take a distinct biographical shape, and those of the synoptical Gospels bear little signs of conscious literary effort. But Plutarch's *Lives of Illustrious Men* (which separately describe, and then compare, a Greek and a Roman warrior or statesman), is a biographical work of high merit. Tacitus' *Sketch of Agricola* is an excellent study of character, and Philostratus' *Life of Apollonius of Tyana* (the false Christ of the 2d c.) is very ingenious, though for the most part incredible. Although of late a vast number of biographies has issued from the press, good lives of many most eminent men are sadly wanted.

Biology (Gr. *bios*, life; *logos*, a discourse). This name has been applied to indicate that department of science which, in the fullest sense, deals with the structure, functions, and distribution of living beings. It thus comprehends the two sciences of *Zoology* (animals) and *Botany* (plants). General B. exhibits a division into (a) *Morphology* (or the science of form), (b) *Physiology* (the science of function), and (c) *Distribution* (the science by means of which the habitat, in time present or past, of any living being is ascertained). To these three divisions some add a fourth, the science of *Etiology*, through which the derivation of any living being may be investigated, in view of recent theories respecting the evolution or descent of living beings, through the modification of pre-existing forms. The following table indicates the method of B., or the mode in which the perfect study of any living being—animal or plant—must be carried out:—

B. (Science of living beings) includes—	1. Morphology, science of form.	a. Anatomy. b. Development. c. Taxonomy or Classification.
	2. Physiology, science of function.	a. Function of nutrition. b. " reproduction. c. " innervation.
	3. Distribution.	a. In space (geographical). b. In time (geological). Questions of descent.
	4. Etiology.	

Bioplasm, a term originated by Dr Lionel Beale, which has been used synonymously with *Protoplasm* (q. v.) to indicate the albuminous substance of which the bodies of all living beings are principally composed, and which exists in its simplest and most primary form in the Protozoa or lowest animals, and *Protophyta* or lowest plants. The name *Sarcodæ* is also used to indicate this substance. See also ALBUMEN.

Bi'on, a Greek idyllic poet, who flourished in the 3d c. before Christ, was a native of Smyrna, and a contemporary of Theocritus. From the elegy written on his death by his friend and brother bard Moschus, we learn that he spent the last part of his life in Sicily, and perished by poison. The most important of his extant writings is a *Lament for Adonis* (edited by Ahrens, Leips. 1854). His other pieces are merely fragments, but are distinguished by delicacy of expression, purity of feeling, and a simple and natural delineation of pastoral life. They have often been printed and translated with the poems of Theocritus. Separate editions of B. in modern times have been published by Jacobs (Gotha, 1795), Wakefield (Lond. 1795), and, along with Moschus, by Hermann (Leips. 1848). Good translations into German have been executed by Voss (1808) and Mörike (1869).

Biörn'eborg, a seaport of Finland, on the Gulf of Bothnia, 76 miles N.N.W. of Abo, with an export trade in timber and pitch. Pop. (1876) 7346.

Bi'ot, Jean Baptiste, a distinguished French physicist, was born at Paris, 21st April 1774, educated at the College of Louis le Grand and the Ecole Polytechnique, and in 1800 became Professor of Natural Philosophy at the College de France. In 1808 he became a member of the Académie des Sciences, and took part in the first balloon ascent of M. Gay Lussac. He accompanied M. Arago (q. v.) to Spain to measure a degree of the meridian, and reported the result to the Institute. B. subsequently undertook many other scientific voyages, and made

numerous important discoveries in optics, especially in the polarisation of light. He died at Paris, February 3, 1862. Among his writings are *Traité Élémentaire d'Astronomie Physique* (Par. 1805, 3d ed. 1841-57); *Traité de Physique expérimentale et mathématique* (Par. 1816); *Précis élémentaire de Physique expérimentale* (Par. 1817); *Recherches sur l'Ancienne Astronomie Chinoise* (Par. 1840); and *Études sur l'Astronomie Indienne* (Par. 1862).

Biped, literally 'two-footed,' a term applied to such animals as walk on two legs, and generally applied to man and to birds, to indicate their mode of progression, rather than the mere possession of two limbs. Some of the quadrumans or apes may temporarily assume a bipedal attitude. The whales among mammals and the sirens among *Amphibians* or *Batrachia* (q. v.) may be termed *bipeds*, as these forms possess the front pair of limbs only. Some fishes also want two of the paired fins (representing the limbs of other animals), and may therefore be also termed bipedal in a sense.

Bipenn's, a double-headed axe, said to have been wielded by the ancient Amazons.

Biquadratio (Lat. *bis*, twice, *quadrus*, square), in algebra is a term applied to equations of the fourth degree, the general form being $x^4 + ax^3 + bx^2 + cx + d = 0$. See EQUATION.

Bir, or **Bireh-jik**, a town of Asiatic Turkey, vilayet of Bagdad, Syria, situated on the Euphrates, in the great route from Aleppo to Diarbekr, and 150 miles W. of Adana. It is the ancient *Birtha*, Turkish *Bireh-jik*; the word *bir* meaning a 'well,' and occurring in the names of several other Arabian towns. B. is a place of some importance from its position, and has considerable trade in cotton, silks, wine, tobacco. It is 597 feet above the sea, and would form a station on the projected Tigris Valley Railway. Pop. 10,000.

Birch (*Betula*), the generic name of several species of trees and shrubs. The common or white B. (*B. alba*) is a well-known tree of a graceful and airy aspect, very common in the mountainous districts of Scotland, and being one of the hardiest of all trees, is found growing far N., even into Arctic regions. It has a wide geographical range, growing generally in the temperate and sub-Arctic regions of N. America, Europe, and Siberia. Great forests composed entirely of the B.-tree are found in Russia, where the bark and wood are applied to a great variety of useful purposes by the peasantry. The entire tree, wood, bark, and leaves is impregnated with essential oil, and to the oil of the bark is due the agreeable smell peculiar to Russia leather, in the tanning of which it is used. The outer cuticle of the bark becomes white, and scales off in thin papery sheets, and in India the sheets so obtained from a species of B. (*B. Bhojputra*) were at one time used as paper, while to the same property is owing the name of a species of B. growing throughout N. America (*B. papyracea*), from the bark of which very light useful canoes are fabricated. B.-bark is exceedingly tough and durable, and applied in Northern countries to many useful purposes. In Russia it is made into drum-shaped boxes for holding caviare, &c., and small boxes are frequently made from it, on which are impressed elegant stamped and incised ornaments. B. yields a close-grained durable wood, which is very extensively employed in the manufacture of chairs, tables, bedsteads, and the woodwork of furniture generally; but the great part of the B. wood for furniture is imported from America, and is the produce of the black B. (*B. lenta*). The wood of the white B. is used by the Tartar peasantry of the Russian empire for turning into sugar-basins, &c., which, painted a bright vermilion colour, and gilt, are exported from the Baltic ports. B.-wine is a beverage prepared from the fermented sap of growing trees, and prepared on a large scale in Russia. The dwarf B. (*B. nana*) is a low shrubby plant indigenous to Scotland, and found generally throughout the N. of Europe and the Arctic regions. Among the other species may be mentioned the white B. (*B. populifolia*) of N. America; the *B. acuminata* of Nepal; and the *B. Antarctica* of the neighbourhood of Cape Horn.

Birch, Samuel, LL.D., keeper of Egyptian and Oriental antiquities in the British Museum, is the eldest son of the late Rev. Samuel B., D.D., and was born in London 3d November 1813. He completed his education at Merchant Taylors' School, which he left in 1831. B. began his career in the public service at

the age of twenty-one, when he was employed under the Commissioners of Public Records. Two years later he was appointed assistant in the department of antiquities in the British Museum, and rose in 1844 to be assistant-keeper. On the new organisation of the department in 1861, B. was appointed keeper of the Oriental, mediæval, and British antiquities and ethnographical collections; but, by a further subdivision of labour, his office is now keeper of the Egyptian and Oriental antiquities. B. is corresponding member of the Archæological Institute of Rome, of the Academy of Berlin, and of the Academy of Inscriptions and Belles-Lettres in the French Institute. The honorary degree of LL.D. is from St Andrews. He is also an honorary member of the Royal Society of Literature, of the Society of Antiquaries, of the Oriental Society of France, as well as of the Ethnological Society of America. B. has long been a profound student of Egyptian hieroglyphics. This latter fact attracted the admiring attention of the late Baron Bunsen, who availed himself largely of B.'s special knowledge in the philological portion of his work *Egypt's Place in Universal History*. Baron Bunsen requested that he should revise future editions of this work; and accordingly in 1867, some years after Bunsen's death, he issued the fifth volume, the greater part of which is written by himself. B.'s principal publications are *Gallery of Antiquities* (1842); the text of Owen Jones' *Views on the Nile* (1843); along with Mr Newton, *Catalogue of Greek Vases* (1851); *Introduction to the Study of Hieroglyphics* (1857); *History of Ancient Pottery* (1858); *Description of the Papyrus of Nas-Khem* (1863), and the *Rhind Papyri* (1866). The papyrus of Nash-Khem, priest of Amen-ra, was discovered in an excavation made in a tomb near Gournah at Thebes by direction of the Prince of Wales, is the property of his Royal Highness, at whose expense it was printed for private circulation. B. presided over the Congress of Orientalists held in London in 1874. He is an able Chinese scholar, and has published (1841) *Analecta Sinensia*, short stories from the Chinese; *The Friends till Death* (1845), a translation from that language; and *Chinese Romance—The Elyn Foxen* (1863). He has written in the *Archæologia*, the *Transactions of the Royal Society of Literature*, the *English Encyclopædia*, *Chambers's Encyclopædia*, the *Encyclopædia Britannica* (new edition), the *Revue Archéologique*, the *Archæologische Zeitung*, and the *Zeitschrift für Ägyptische Sprache und Alterthumskunde*.

Birch, Thomas, D.D., author of many secondary works on history, was born at Clerkenwell, London, 23d November 1705. Although of a Quaker family, he entered the Church of England (1730), obtained numerous preferments, was made D.D., rector of Deepdene in Surrey, and one of the secretaries of the Royal Society (1752). He was killed by a fall from his horse, 9th January 1766. B. was an indefatigable, though not very elegant, writer in the departments of history and biography. Among his works may be mentioned *Memoirs of Queen Elizabeth*; *Lives of Henry Prince of Wales*; of Raleigh; of Boyle and Tillotson; *Thurlow's State Papers*; and a *History of the Royal Society*. B. left his library and a collection of MSS. to the British Museum, of which he was a trustee.

Birch-Pfeiffer, Charlotte, a celebrated actress and playwright, was born at Stuttgart, 1800, made her début at Munich in her thirteenth year, and played for many years at Berlin, Vienna, St Petersburg, &c. She married the Danish author Dr Christian Birch in 1823, was directress of the Zurich theatre, 1837-43, and also of the Hoftheater at Berlin from 1844. She died at Berlin, August 24, 1868. Of her numerous plays, which are marked by dramatic force, though marred by sensationalism, may be mentioned *Pfeifferrösel* (1833), *Der Glückhner von Notre-Dame* (1839), *Die Marquise von Vilette* (1845), *Dorf und Stadt* (1848), *Waise von Lowood* (1856). Her *Gesammelte Dramatische Werke* were published at Leipsic in 13 vols., 1863-69.

Bird-Bolt, an arrow with a blunt head, which in former times was shot from a crossbow to kill rooks with.

Bird-Catching Spiders, a name applied to spiders belonging to the genus *Mygale*, from their habit of entrapping small birds in their nets, and by other means. The name, so far as bird-devouring habits are concerned, might also be applied to another genera of spiders, such as *Epeira*, &c. *Mygale avicularia*, found in Surinam and elsewhere, a large black

spider, averaging about two inches in length, is thus said to capture birds by pouncing upon them. This American species has its allies in Africa and the E. Indies, which similarly hunt for birds, but prey also upon insects. The nests of these spiders consist each of a tubular cell, formed of a silky material, and situated among stones and in the clefts of trees. Madame Merian, in her account of travels and of the insects of Surinam, relates and figures the instance of a *Mygale* devouring a small bird which it had 'torn from its nest.'

The *Epeira* (of which genus the *Epeira diadema*, or common garden spider, is an example) of tropical countries are said to entrap small birds in their webs.

Bird-Cherry (*Padus*), a subdivision of the genus *Cerasus* (cherry), which is again perhaps only a sub-genus of *Prunus* (plum). The common bird-cherry (*Prunus Padus*), or haggberry, is a shrub of 6 or 8 feet, or sometimes a small tree, with small, nearly globular, black and bitter fruit, with a rugged stone. It is found in Northern and Central Europe and Asia, from the Arctic regions to the Caucasus and Himalayas, but disappears in S.W. Europe. It is rare or absent in Ireland and Southern England, but is scattered over the rest of Europe. A spirit is distilled from the fruit, and in Siberia the refuse after expressing the juice is made into cakes. *P. Virginiana* is found in America from Canada to Tennessee, and is cultivated in Britain as an ornamental tree. Its bark is febrifuge, and its wood is used by cabinetmakers. It grows to a height of from 80 to 100 feet.

Bird, Edward, an English artist, was born in Wolverhampton, 12th April 1772, and earned his first money by painting flowers, shepherdeses, &c., on tea-boards for a Birmingham manufacturer. Afterwards he established himself as an artist in Bristol, where he died, 2d November 1819. His 'Choristers Rehearsing' and 'The Will' were purchased by William IV. and the Marquis of Hastings, and after these successes he was elected Royal Academician. Princess Charlotte appointed B. her painter. His finest work is his 'Chevy Chase after the Battle.' Others well known and much admired are 'The Village Politicians,' 'The Blacksmith's Shop,' 'The Country Auction,' and 'The Young Recruit.'

Bird Land, one of the Sandwich Islands, 290 miles W.N.W. of He Aliu, and haunted solely by sea-fowl; hence its name.

Bird-Lice, the name applied to the insects of the order *Mallophaga*, a group of lower or apterous insects undergoing no metamorphosis, and which are destitute of wings. These lice are chiefly parasitic upon birds, and eat the feathers of their hosts by means of their strong masticatory mouths. They frequently destroy the entire plumage, and otherwise affect the health of the bird. They are classified in two families—the *Phthiraptera* and *Liothetida*.

Bird-Lime, a viscid, tenacious substance used for spreading on branches, twigs, and other perches of small birds, for catching them. B.-L. is prepared from the bark of the holly, the mistletoe, and various other plants, by boiling, and allowing the strained boiled bark to ferment for some weeks. Boiled seed oil may also be used as B.-L.

Bird-Pepper is made from the powdered fruits of *Psidium baccatum* of the West Indies.

Bird of Paradise, a genus of Insectorial or catching birds, forming the type of the family *Paradisæida*, a group nearly allied to the crows (*Corvidæ*). The males of these birds are celebrated for the immense development of the feathers on the sides of the body and neck, these feathers in the common or emerald B. of P. (*Paradisæa apoda*) appearing as long detached plumes, of light texture, and of exceeding brilliancy. The emerald species averages a crow or jay in size, and is coloured cinnamon, the head and neck being yellow, whilst the front part of the body and throat are bright green, and the expanded feathers yellow. These shoulder-feathers attain a length of two feet. The tail in this species also possesses elongated filaments of horny texture with twisted extremities. The plumes are extensively used in the manufacture of head-dresses and other articles of female decoration. These birds appear to be polygamous. The females are coloured of a sombre tint, and want the splendid appendages of the males. *Paradisæa rubra* possesses the expanded shoulder-tufts of a red or carmine colour. Other

species are the *P. superba*, *P. sacerdosca*, and *P. regia*. These birds inhabit New Guinea and neighbouring islands. They con-

gregate in troops in the dense forests, and appear to feed on fruits, rice, insects, &c. They pass from island to island according to the change of seasons, and appear to fly invariably against the wind. The wings are long and rounded. The tip of the upper mandible is notched. The hinder toe is long, and the claws are of large size and curved. These birds are shot by the Malays with arrows, and are generally captured during the night. The skins are dried by fire, and the legs are cut off—a circumstance which induced Linnaeus to give to the emerald species the specific name of *apoda*, or 'footless,' although the great naturalist was himself well aware that these birds possessed legs. Various fables and stories of a ridiculous kind have from time to time been promulgated respecting these birds, such as the ideas that they were footless, and wholly lived in the air; that they fed on dew and vapours, &c. The natives name them *Manuco-Dewata*, or 'God's birds,' and other names, such as 'sun-birds,' 'birds of the air,' &c., have been applied to them from their gorgeous appearance.

Birds or Byrd, William, an English musician, born about 1543, was the son of Thomas B., one of the members of the Chapel Royal in the reign of Edward VI. He composed ecclesiastical music, little of which is now known except the *Non nobis, Domine*. Elected organist at Lincoln Cathedral in 1563, he was appointed a gentleman of the Chapel Royal six years after. B. was reckoned the finest player on the virginal in his day. He died 21st July 1623.

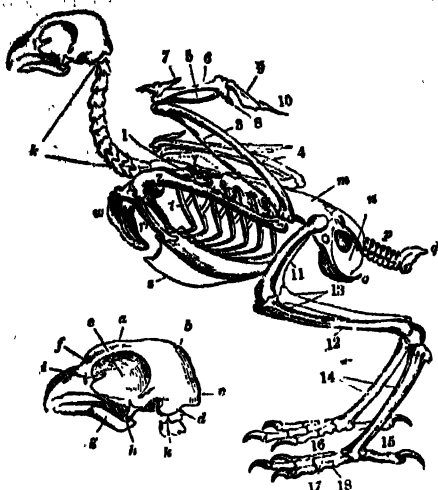
Birds, a class of vertebrate animals, defined as possessing bodies covered with feathers; as being *oviparous*, or producing eggs, from which the young are afterwards hatched; as possessing warm blood, a four-chambered heart, a perfect circulation, and having fore-limbs modified for flight. The lungs in B. are further perforated, and the main bronchi or air-tubes open upon their surface, so that the air received into the lungs escapes into the body. This latter character is specially distinctive of the bird class. The body covering of B. consists of feathers, which are produced from *papilla*, or small processes of the dermis or true skin. These papillae are grooved, and in the grooves horny matter is deposited, and finally pushed outwards in the form of feathers. Each feather consists of the *quill*, continued upwards into the *shaft*, which bears on each side the *web* composed of *barbs*. The barbs are kept in close apposition by means of smaller barbs or *barbules*, which bind the various barbs of the web firmly together. The feathers of the hand are termed *primaries*; those attached to the fore-arm, *secondaries*; and those of the upper arm, *tertiaries*. The great tail-feathers are named *rectrices*. The *ulula*, or bastard wing, is the name given to the feathers borne by the small *thumb*.

The *skeletons* of B. exhibit many adaptations to their aerial life and habits. The bones are exceedingly light, owing to their containing a much greater proportion of phosphate of lime and analogous salts; and in most B., the long bones, instead of containing marrow, are filled with air: such bones are therefore named *pneumatic*. The neck region of B. is very flexible, and contains from nine to twenty-four vertebrae. This flexibility of the neck region admits of extensive movement of the beak. The back or dorsal region is fixed and consolidated, so as to afford a firm *point d'appui* for the movements of the wings. The dorsal vertebrae vary in number from six to ten. In Running B., however (e.g. ostrich, &c.), a greater or less amount of motion is permitted between the segments of the back region. The vertebrae which intervene between the dorsal segments and the caudal or tail vertebrae are ossified together, so as to form a single bone, named the *sacrum*, and which consists of from nine



Bird of Paradise.

to twenty united bones. The *caudal* or tail vertebrae number from eight to ten. The last vertebrae form the 'ploughshare-



The above cut, representing the skeleton of the falcon, shows the skull with the large *orbit* or eye-cavity; the flexible neck region (*h*); the dorsal or back region (*l*); the *pelvis* (*m, n, o*); the tail (*p*); and the ploughshare-bone or *pygostyle* (*q*). The breastbone with its prominent *keel* is shown at *s*; the united *clavicles*, forming the merry-thought, at *w*; the coracoid bones supporting the wing at *r*; and the ribs at *t*; and the scapula or shoulder-blade at *x*. The wing-bones consist of the humerus (*a*); the ulna (*4*); and radius (*3*); the thumb (*7*); the metacarpus or palm (*5* and *6*); and the fingers (*8, 9*, and *10*). In the lower limb, the thigh (*11*); leg (*12* and *13*); the tarso-metatarsal bone (*14*); and the toes (*15, 16, 17*, and *18*). The detached figure of the skull shows the frontal bone (*a*), parietal (*b*) and occipital bone (*c*), the articulating part of the occipital bone (*d*); the orbit (*e*); the mandible, or lower jaw (*g*); and at *h* the *os quadratum*, by means of which the lower jaw is articulated to the skull.

bone,' or *pygostyle*, on which the uropygium, or oil-gland, is situated, and into which the great feathers of the tail are inserted. The Cursorial or Running B. do not possess a ploughshare-bone, and in the extinct *Archaeopteryx* (q. v.) this bone was also wanting. The skull of B. is very compact, and is joined by a single occipital condyle, or process, to the spine. The Bill (q. v.) consists of the upper and lower mandible; the lower jaw in B. (as in reptiles) being a compound bone, and being joined to the skull by a special bone, the *os quadratum* or *os carré*. No teeth exist in B., although the horny sheaths of the jaws may be more or less strongly serrated. The *orbit*, or eye-cavity, is always of large size. The ribs forming the sides of the chest or *thorax* number from six to ten pairs. Each rib is generally joined to its hinder neighbour by a hooked bone or process, known as the *uncinate process*. The true ribs are joined in front to a series of bones which arise from the sternum or breastbone, and which are named *sternal ribs*. These latter correspond to the costal cartilages of mammalia, and constitute the movable centres in breathing. The *sternum* or breastbone bounds the chest in front. In all B. (save the Cursorial or Running B., which do not fly) the breastbone bears a prominent bony ridge or keel in front. This keel serves for the attachment of the great muscles of the wings (*pectoral muscles*); and hence it is easy to tell if a bird possesses great powers of flight by looking at the relative size of the keel, which, accordingly, is largest in the most powerful flyers. In the ostriches, &c., the breastbone, on the contrary, presents in front the appearance of a comparatively flat shield, without any ridge or keel. The collar-bones, or *clavicles*, are usually united to form the *furculum*, or 'merry-thought.' The *coracoid bones* are greatly developed, and articulate directly with the breastbone, so as to form the chief supports for the wings; whilst the *scapula*, or 'shoulder-blades,' exist as simple bones of small size. The wing consists of the *humerus*, or upper bone of the arm; of a large *ulna* and slender *radius* in the fore-arm; and of three wrist or *carpal* bones; of three united *metacarpals*, and of two *fingers* or *digits* (*index* and *ring* fingers), and a rudimentary thumb. The *pelvis* consists of two *innominate bones*,

which, however, are not united in front at the pubis in any bird, except in the ostrich. This open disposition of parts has probably reference to the laying of eggs. The lower limbs consist each of a *femur* or thigh-bone, of a large *tibia* or shin-bone, and small or rudimentary *fibula*. The upper extremity of the *tarsus* in B. is ossified to the lower end of the tibia, and the lower half of the tarsus is similarly ankylosed with the metatarsus. The tarsus and metatarsus thus together form the *tarso-metatarsal* bone, which, in Wading B., gives the great length to the legs.



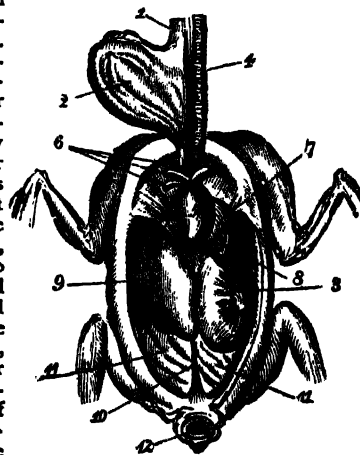
Feet of Various Birds.

a, Foot of Raptorial Bird; *b*, of Percher; *c*, of Rasorial Bird; *d*, of Wader; and *e*, of Swimming Bird.

The ankle-joint of B., as in reptiles, is thus placed in the middle of the tarsus, instead of at the upper or proximal extremity, as in mammalia. The *toes* are four in number in most B., three being placed forwards, and the fourth (the *hallux*, or great toe) being directed backwards. Sometimes, as in parrots and other Scansores, two toes are directed forwards and two backwards. In Swifts, all four toes are turned forwards. The Ostriches possess two toes only, and the Emus three; while in many other B. the fourth or hinder toe may be rudimentary.

The digestive system of B. includes a *tongue* (which, however, is generally sheathed in horn, and not adapted to serve as an organ of taste); of *salivary glands* of simple structure; of a single or double *crop*, or *ingluvies*, serving as a receptacle for food; of the *proventriculus*, or true digestive cavity; and of the *gizzard*, a muscular cavity, usually provided internally with horny ridges, by means of which the food is triturated and broken down. The intestine is comparatively short; the beginning of the large, or terminal, part of the intestine being generally marked by two *caca*, or blind-pouches, often (as in grouse) of great length. The intestine terminates in the *cloaca*, a chamber which also receives the terminal ducts of the urinary and generative organs. The *liver* is always large, and the *pancreas*, or sweetbread, is contained within a loop of the intestine at its commencement of that tube as it leaves the gizzard. A *spleen* is always, and a *gall-bladder* generally present. The *gizzard* is best developed in grain-eating B. In flesh-eaters and insectivorous B. it is of rudimentary nature, and of thin membranous structure. Small pebbles or stones are generally swallowed by grain-eating birds, to assist the gizzard in its work of crushing the seeds and grains.

The *heart* and *circulation* of B. do not differ from those of mammalia. The heart consists of two auricles and two ventricles,

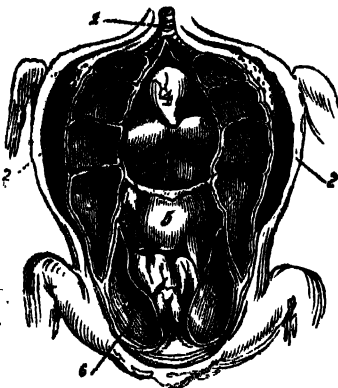


Internal View of Bird.

The gullet is represented in this cut at 1, the crop at 2, and the muscular gizzard at 3. The windpipe (4) is also seen; the heart (5), with the chief vessels (6), and pericardium, or heart sac (7). The liver is exhibited (8 and 9); the intestines covered by peritoneum (11); and the cloaca, or vent (12).

the right auricle and ventricle being exclusively devoted to sending the venous or impure blood for purification in the lungs, whilst the left side of the heart is as exclusively devoted to sending pure or arterial blood out through the body. The blood of B. is warmer than in any other group of animals. Its temperature varies from 100° to 110° or more; the average temperature being 103° or 104°. That of man and mammalia is about 98°. The red blood corpuscles of B. are oval in shape, and are nucleated. Only one aortic arch—the right—exists, instead of two, as in reptiles.

The respiration of B. is carried on by means of lungs, which are of a bright red colour, and of spongy or cellular texture. The lungs are attached to the back-wall of the chest, which, however, is not separated from the abdomen by a diaphragm or midriff, as in mammals. The bronchial tubes of each lung give off the air-cells in which the blood is purified; but the main bronchi pass through the lung and open on its surface by a definite number of apertures. Through these apertures the air escapes from the lungs into large sacs or cavities situated in various parts of the body of the bird, and known as *Air-sacs* or *Air-cells* (q. v.), whilst from the latter receptacles the interior of the bones are also filled with air. These bones are not pneumatic in young B., but become so as adult life is attained. In some



The air-cells and lungs of the ostrich are represented in the above cut. The windpipe is seen at 1; the lungs at 2, 2'; the chief air-cells of the chest at 3, 3'; with the orifices of the air-tubes which supply them. The heart is seen at 4; and the stomach and intestines at 5 and 6.

B. (e.g., penguin, apteryx, &c.), none of the bones are pneumatic; whilst in others (ostrich, &c.), only some of the bones are filled with air. Others (e.g., pelican) possess air in nearly every bone of the body. The uses of this distribution of air throughout the bodies of B. may be summed up by saying that, firstly, the specific gravity of the body is thereby diminished; secondly, the muscular work of the body is thus rendered less tiring; thirdly, the blood is more perfectly purified; and fourthly, a high temperature is thus maintained; whilst, fifthly, B. are also enabled thus to prolong their notes in singing to a great degree. The kidneys of B. are large, and two *urters* discharge the urine into the cloaca. No urinary bladder exists.

The brain evinces a superiority to that of reptiles, its chief mass being made up of the *corpora striata* of the higher brain. The *cerebellum* or lesser brain is represented by its central lobe or vermiform process. The *corpus callosum* is absent, and no convolutions exist on the surface of the brain. The eyes are well-developed in all B., and possess *sclerotic plates* in their outer coat. Besides the ordinary eyelids, a third eyelid, or *nictitating membrane*, is present in B. No outer ear exists, but the feathers surrounding the aperture of the ear can in some cases be raised, so as to imitate the functions of an external ear. The internal ear is well developed. The nostrils open in the upper mandible, and are sometimes protected by scales or valvular processes. The sense of taste is not very perfectly developed, the tongue being horny in most B., but fleshy in the Parrots. Touch is a sense not present in great perfection in B. It may be subserved by the tongue, by the Bill, (q. v.), as in ducks, &c., or by the *cere*.

B. are strictly *oviparous*, producing eggs, which, as they pass through the *oviducts*, receive the 'white' or 'Albumen' (q. v.) and the 'shell.' The young are hatched by *incubation*—a process carried to its fullest extent in B. Some B. (*Autophagi*) run about as soon as they are hatched; others (*Heterophagi*) are dependent for a longer or shorter period on the parents.

B. possess both an *upper* and *lower larynx*, the latter, placed at the lower end of the *trachea* or windpipe, being the true organ of voice and song. For other particulars concerning the different kinds of B., and for other details regarding their structure,

reference must be made to the various respective articles treating of B.—such as ORNITHOLOGY, POULTRY, NESTS, EGGS, &c. &c.

B. are not plentifully represented as *fossils*—a fact presumably due to their aerial habits, precluding their deposition in favourable circumstances for petrification and fossilisation. The earliest bird-traces are found in the Triassic sandstones of America, in the form of footprints, which, some palaeontologists maintain, are rather those of reptiles. The oldest known bird-fossil is the *Archaeopteryx* (q. v.), from the Upper Oolites of Bavaria, this bird constituting of itself the order *Saurura*. In the cretaceous rocks of America, remains of extinct Wading B. (genera *Laornis*, *Hesperornis*, *Palaotringa*, &c.) are found, together with the curious genus *Ichthyornis*. In the newer tertiary rocks—that is, in Eocene, Miocene, and Pliocene strata—bird-remains are comparatively plentiful. The Eocene *Gastornis*, *Lithornis*, and *Protornis* (this last the earliest example of the *Insectores* or *Perchers*), represent the bird-life of that period. The Post-Tertiary or Pleistocene formations, especially of New Zealand, are remarkable as containing the remains of gigantic wingless birds, referable to the genera *Dinornis* (q. v.), *Aptornis*, &c. And in Madagascar the *Epiornis* remains also together to the later period of geology. The eggs of the *Epiornis*, also found in a fossil state, measure from 13 to 14 inches in diameter, and equal 3 ostrich eggs, or 148 hen's eggs in size.

Bird's-Foot (*Ornithopus*), a genus of plants of the sub-order *Papilionaceae*, of the natural order *Leguminosae*, so called from its curved pods, resembling the claws of a bird. There are few species, chiefly S. European, and one S. American. There are two in Britain, *O. cbracteatus* (sand-B.-F.), and *O. perpusillus*, the first growing in sandy situations near the sea, the other in dry pastures.

Bird's-Foot Trefoil (*Lotus*), a genus of *Papilionaceae*, a sub-order of the natural order *Leguminosae*, so named, like the preceding genus, from the resemblance of the pods to the claws of a bird. The genus is not numerous in species. They are abundant in Southern Europe and Northern Africa, and are widely scattered over the temperate regions of the Old World and Australia. In Britain there are *L. corniculatus* (B.-F. T. proper), and *L. angustissimus*. Of the first there are several varieties, which are by some authors described as species. It is by some considered to be the true Irish shamrock. *L. tetragonolobus* (the winged pea) of the S. of Europe is cultivated in our gardens as an annual, and in some parts of Europe for the sake of its seeds, which are used as one of the many substitutes for coffee.

Bird's-Head Processes, or *Avicularia*, the name given to certain peculiar structures which exist on the external surface of many *Polyzoa* (q. v.)—molluscan animals, of which the 'sea-mats' or *Flustra* are good examples. Each process consists essentially of a movable mandible or jaw-like piece, which works into a cup-like portion, the entire structure thus resembling in general form the beak of a bird. These processes appear to be endowed with independent vitality, and their motions are seemingly independent of those of the animal upon which they reside. The vibratile lash-like processes known as *vibracula* are often associated with the *avicularia*. By some naturalists these structures are viewed as peculiarly modified *Zooids* (q. v.) of the organism on which they reside; and by others their use is said to be that of detaining food-particles in the neighbourhood of the mouth of their hosts. See also *PEDICELLARIE*.

Birds of Passage (*Aves migratoria*), the name popularly applied to those birds which exhibit the migratory instinct, and pass from one country or region to another at different times and seasons of each year. The migratory instinct forms one of the most remarkable features of the bird class. The means by which birds are enabled exactly to time their flight to a certain day, and to return year by year to the same country, and even to the same spot, frequently flying over hundreds of miles of sea and land in their journeys, form problems of great interest and difficulty to the naturalist. Many differences may be observed, not only in the times and seasons at which different birds arrive in and depart from any given country, but also in their mode of flight, and in the apparent circumstances which inaugurate their migratory life. Many northern aquatic birds fly southwards to winter in Britain; whilst British birds (e.g., swallow, cuckoo, &c.) in turn pass to warmer and more southern climes on the approach of autumn.

Most sea-fowl appear and disappear with the utmost punctuality—the puffins invariably seeking their stations on a given day. If migratory birds are kept in confinement, they are generally observed to become restless and excited as the season for migration approaches. The mode of migration also varies greatly, some birds flying in great flocks or squadrons (e.g., swallows), whilst others leave singly or in detached groups. The scarcity of food, temperature, breeding-seasons, &c., have each and all been suggested as causes for the migration of birds, but neither singly nor collectively will these causes explain the phenomenon. More recently, the theory of natural selection has been suggested as explanatory of migration.

Birds of Prey, the popular name of the order *Raptores* or *Accipitres* (Linnaeus), distinguished by their curved, notched beaks, and the strong talons of the toes, which are placed three forwards and one behind. The order is divided into the *Nocturnal* B. of P. (owls), and the *Diurnal* forms (eagles, hawks, falcons, &c.).

Birkbeck, George, M.D., was born at Settle, in Yorkshire, 10th January 1776. After studying medicine at Edinburgh, he became in 1799 Professor of Natural and Experimental Philosophy in the Andersonian Institution, Glasgow, where he obtained great popularity through his gratuitous scientific lectures to the skilled artisan class. In 1807 he went to London, and secured a large medical practice, but found time to do much for popular education. He was associated with Brougham (whose friendship he had made at Edinburgh) in founding the London Mechanics' Institution, of which he became life-president. B. died 1st December 1841.

Birkenhead ('the head of the birken' or 'birchen trees'), a flourishing town and seaport of Cheshire, lies opposite Liverpool, on the left bank of the Mersey, which is here 1340 yards wide. It is of modern growth, and owes its increase and prosperity to its commodious and splendidly constructed docks. The town is regularly built, contains many fine public buildings, a large market, a free public library, and a beautiful public park of 180 acres. The chief industries for which it is universally famed are shipbuilding and the manufacture of machinery. There are here the shipbuilding-yard of Messrs Laird, the Canada Works for constructing great iron bridges, the Britannia Machinery Works, &c. The docks, however, are the principal feature of B., and the cause of its rapid rise. They include a floating harbour, with an area of 120 acres and a depth of 19 feet, and have a total accommodation (1875) of some 400 acres. The communication with Liverpool is maintained by means of an excellent system of steam ferry-boats, and is further facilitated by the railway bridge across the Mersey at Runcorn, 14 miles distant. A railway tunnel has been projected (1875) to pass below the river, and thus more completely to connect B. with its compeer. Pop. (1821) 236, (1861) 36,212, (1871) 42,981. Along with Claughton, Oxtou, Tranmere, and part of High Bebington, B. returns one member to Parliament. A Benedictine priory of the 12th c., the remains of which are still preserved, gave rise to the small village of B., the nucleus of the present town. Edward II. granted to the monks of this priory the monopoly of the ferries. The name B., like the 'Broomie Law' of Glasgow, points back to a time when nature was undisturbed by commerce.

Birmingham (Old Eng. *Bermingeham*), popularly called **Brummagem**, a city in Warwickshire, on the rivers Rea and Tame, 69 miles S.S.E. of Manchester, and 112 miles N.W. of London. It is the fifth city of Britain in point of size, and is the chief seat of the metallic manufactures. Situated in a fine district, it is one of the healthiest of English cities, having a splendid drainage and water supply. Its manufactures are valued at upwards of £5,000,000 yearly, and consist mainly of articles of gold, silver, iron, brass, steel, mixed metal, &c. Gun-making is carried on to a large extent; the jewellery trade and the manufacture of electroplated goods have largely increased; iron castings are made, from those of many tons weight, for steam-engines, machinery, and buildings, down to the smallest fittings for harness, guns, watch-keys, &c.; and more recently the manufacture of galvanised iron ware for roofing, buckets, &c., has become of prime importance. B. is unrivalled for its papier-mâché manufactures; button-making is a special trade; pins, the manufacture of which once employed so many different classes of labourers, are now

struck at once by machinery; and the best glass in the English market is manufactured in the district. To these industries may be added the manufacture of fancy goods in leather and wood, of surgical instruments, of soap, of varnish, &c. There are also numerous coachbuilding establishments, breweries, chemical works, cartridge factories, &c. B. is the great seat of the manufacture of steel pens, of which 98,000 gross are made weekly, the value of them amounting to £3000, and the weight of steel used in their production being about 10 tons. Steam-engines were first made in England at the Soho Works, founded by Watt and Boulton. The city has many handsome public buildings; among these are the Town Hall, built in 1833 to hold 6000 persons, with a magnificent organ; the B. and Midland Institute, finished in 1866, one wing of which contains the free library, opened in 1861; the Central Railway Station in New Street, an imposing structure in the Italian style; the Exchange, in course of erection; and the new Post Office, and Corporation buildings. Josiah Mason, a manufacturer of steel pens, built and endowed the Erdington Orphan Houses in 1869, and in 1873 endowed a college for the study of practical science. In 1853 Queen's College was organised in connection with the London University; and there are a Roman Catholic college, a richly endowed grammar school, a diocesan training college for schoolmasters, a botanic garden, an art gallery, and four public parks. There are upwards of 170 churches, of which over 60 belong to the Establishment. Darwin, author of the once famous *Botanic Garden*, and grandfather of the celebrated propounder of the evolution theory, resided here. Pop. (1871) 343,787. B. returns three members to Parliament. Before the civil war B. has no place in history, and even after that it is long noticeable, except as a thriving seat of industry. It first, and not creditably, emerged into general notice by its outrage on Priestley, whose house was destroyed in 1792 by an ignorant mob, incensed at his liberality as a politician and a theologian—a crime for which it has recently atoned by erecting a statue to his memory; but since 1832 B. has taken a prominent part in national politics. It is now (1875) regarded as the representative city of what is known as the 'Advanced Liberal' or Radical party, and, unlike some other great cities, has never wavered in its love of extremes. After the passing of the Education Act of 1871, it displayed remarkable energy in carrying out its provisions, and in particular arrested universal attention at the last school board election by pronouncing in favour of the principle of 'united secular and separate religious instruction.' B. has shown great readiness to take advantage of the recently granted facilities for city improvements. For this purpose the municipality purchased some 30 acres in the centre of the city in 1875.

Birnam Hill, in Perthshire, near Dunkeld, 12 miles N.W. of Perth, is 1580 feet high. It was once covered with a royal forest, to which Shakespeare alludes in his *Macbeth* (Act v. Sc. 5)—

'Fear not till Birnam wood
Do come to Dunsinane.'

Bir'ni, the former capital of Bornu, Central Africa, on the river Yeu, 75 miles W. of Lake Tchad, not now in a prosperous state. It is, however, walled, and has still considerable markets. Pop. 10,000. The present capital is Kuka (q. v.), on W. shore of Lake Tchad.—New B., a walled town of about the same size as the former, lies 20 miles S. of Kuka, and has an extensive mud palace.

Biron, a title assumed by an ancient and distinguished French family, **De Gontaut**, of which the following are the most conspicuous members: 1. **Armand de Gontaut, Baron**, afterwards **Duc de B.**, born about 1524, secretly favoured the Huguenots, but took part against them in the religious wars of the times, and was one of the negotiators of the peace of St Germain in 1570. On the night of the massacre of St Bartholomew, B. was in the arsenal of Paris, and protected the Huguenots who were with him. Charles IX. appointed him to the command of La Rochelle, but the inhabitants successfully resisted the appointment. He was made a marshal of France in 1577; and at the death of Henri III., in 1589, was one of the first to welcome Henri of Navarre, under whom he distinguished himself at the first siege of Paris, and at the battle of Ivry. He was killed at the siege of Epemay, July 26, 1592.—2. **Charles de Gontaut, Duc de B.**, son of the former, was born in

1563; at the death of his father was made an admiral, and two years later a marshal of France. He stood high in the esteem of Henri IV., who heaped favours upon him. Daring and brave in battle, he was at the same time indifferent to both sides of the religious struggles of the time, vain, presumptuous, and always in want of money. This last circumstance induced him to intrigue against the king, who twice spared him, but at last was forced to send him to the Bastille. He was tried and condemned to death, a sentence which was put in execution, July 31, 1602.

—3. **Armand Louis**, first Duc de Lauzun, and subsequently Duc de B., born April 15, 1747, brought himself into notice by a tract *Sur l'Etat de Défense de l'Angleterre et de toutes les Possessions dans les Quatre Parties du Monde*, owing to which he was put in command of an expedition against the British possessions on the W. coast of Africa. Arriving at Cape Blanco, he took the fort there, January 30, 1779, and sent a portion of his fleet towards the Gambia, which was successful in seizing some of the British possessions on the coast. After returning to France, B. crossed the Atlantic, and took part in the American War of Independence in 1780. Coming back to France, he was sent to the States-General as a deputy of the nobles; was appointed in 1791 to the command of the army of the north; in 1792, commander-in-chief of the army of the Rhine; in 1793, commander-in-chief of the army of the *Côtes de la Rochelle*, distinguishing himself greatly in all these positions. But he had the misfortune to excite the suspicions of the Committee of Public Safety, and after what was called a 'trial,' was guillotined, December 31, 1793. See *Mémoires de M. le Duc de Lauzun* (Par. 1822).

Biron, Ernst Johann, Duke of Courland, was the son of a Courland gentleman of German origin, named Bühren, and was born in 1687. He gained the favour of Anna Ivanovna (q. v.), niece of Peter the Great, and Duchess of Courland, and was made by her, when she ascended the throne of Russia in 1730, a principal administrator of the empire. At this time he assumed the name and arms of the French family of B. B. ruthlessly removed every obstacle in the way of his advancement, but introduced order and vigour into all the branches of the administration. He was made Duke of Courland in 1737, assumed the regency on the death of the empress in 1740, but in consequence of a successful conspiracy was arrested in less than a month, and sentenced to death. His sentence being commuted into banishment for life, he was exiled to Siberia. Recalled by Elizabeth in 1741, he was permitted to reside at Jaroslav. In 1763 Catherine II. reinstated him in his dukedom, which he governed with singular moderation and justice till his death, 28th December 1772. See *B.'s Leben*, Brem. 1772. He was succeeded by his son, **Pieter B.**, Duke of Courland and Sagan, and Count of the German empire, born at Mita, 15th February 1724. His reign was stormy and unfortunate. He could not manage his subjects at all, and finally (28th March 1795) he relinquished his duchy to the Empress Catherine, only reserving to himself and family ducal honours and rights. Pieter died, 12th January 1800, at Gellenau, in Silesia. By his third wife he had four daughters, the youngest of whom, Dorothea, born 21st August 1793, married, 23d April 1809, Edmond, Duc de Talleyrand-Perigord and Duc de Dino, in Calabria, and died 19th September 1862. Their eldest son, Napoleon Louis, Duc de Valençay, born 12th March 1811, inherited from his mother the Prussian principality of Sagan; while the second, Alexander Edmond, born 15th December 1813, obtained by his father's abdication the lordship of Deutsch-Wartenburg. See Tiedge's *Anna Charlotte Dorothea, letze Herzogin von Kurland* (Leips. 1823). A brother of Pieter's, the last Duke of Courland, carried on the male line of the Birones, some of whom have distinguished themselves in the Russian and Prussian services.

Birr. See PARSONSTOWN.

Birs, an inconsiderable Swiss stream which rises in the N.W. border of the Canton of Bern, flows in a N.E. direction, and joins the Rhine near Basel. Its banks are memorable for two conflicts: (1) that of 26th August 1444, fought at the Chapel of St Jakob, about a mile from Basel, in which 500 Swiss were slain by the army of the Armagnacs; and (2) that of July 22, 1499, in which 6000 Swiss defeated 15,000 Austrians at the village of Dornbach, 5 miles S. of Basel. This disaster forced the Emperor Maximilian to conclude the peace of Basel two months later.

Birth, in medicine. See PARTURITION.

Birth. See BASTARDY.

Birth, Concealment of, is a legal offence according to the law of England and the law of Scotland. By the latter, a woman who conceals her pregnancy, and does not call for help in the birth, and whose child is missing, is held guilty of murder. See PREGNANCY.

Birthright, or the right of Primogeniture (q. v.), is the rule of law by which the eldest son is preferred to younger ones and to daughters in succession to the father's real estate. The rule is one of feudal law. It has prevailed in Britain and in most countries of Europe. Its intention has been fortified by the device of entailing property, by which the succession is cut off from one or more of the heirs at law, and settled upon a particular heir or series of heirs. The object of these laws is of course to gratify that desire of human nature which leads a man to wish to preserve entire in his own descendants or heirs the wealth and social status which he has himself acquired or inherited. In considering the expediency of these laws, the fact of the existence of this instinct in our nature, as a strong motive power, is not to be ignored. It may be very contrary to reason that it should exist; but it does; and, were it annihilated, the motive which keeps many a man in the path of industry—which continues to give him an interest in the practical affairs of life, after he has ceased to be interested in these for his own immediate sake—would thereby be impaired or destroyed. The question is a very complicated and difficult one, probably not capable either of theoretical or practical solution. The evils that are alleged against the system lie, really or apparently, on the surface. By it immense estates are accumulated in the hands of one man, while his near relatives are comparatively poor and landless. Again, by it, as other laws affecting the right of property in land now are, enormous power is thrown into the hands of a few men; a power which, were they generally to exercise it, would be intolerable to the community. Thus it has been said that some half-a-dozen men might together exclude the public from half of Scotland. Not from the roads certainly, but from hill and dale, loch and stream; and from the two latter, in some districts, this not only might be, but has been done. On the other hand, to take the same country, the advocates of the system say—"True, 'Jock the laird's brother' may be aggrieved by the law, but this is not a public grievance. Where will you see a more flourishing agriculture—where will you see farmers so intelligent, so wealthy—where will you see a peasantry healthier and better contented than on the lands of the great proprietors of the Lowlands of Scotland?" While each man would no doubt like a slice of land to himself, sooner than see it generally cut up and equally divided among his neighbours and himself, he would probably prefer to have a large property in the hands of one. We give no opinion of our own; we merely endeavour fairly to state the arguments of the advocates and opponents of the system. Public opinion has in recent times certainly been running somewhat against the law of entail at least. Yet if this be bad, it may be difficult to see how B. is good. See ENTAIL, SUCCESSION.

Births, Registry of. Under recent statutes, the father or mother, or the occupier of any house in which a child is born, must give notice of the birth to the registrar of the district in which it happens within forty-two days from the date of birth. And, if required by the registrar, information must be given on the following points: the day of birth; the name, if any has been given; the name and surname of the father; the name and maiden surname of the mother; the rank, profession, trade, or calling of the father. The person giving the information must enter in the register his or her name, description, and residence; and unless this be done, no register can be given in evidence. No fee or payment can be lawfully required of any person giving information respecting any birth. No one shall knowingly cause any birth to be registered otherwise than as mentioned after forty-two days, under a penalty of fifty pounds; and no one shall knowingly cause any birth to be registered after six calendar months from the day of birth (except in case of children born at sea) under the same penalty. No register of births made after six calendar months, with exception as above, will be received in any court as legal evidence. Any one wilfully

making, or causing to be made, any false statement, for the purpose of having it registered, is liable to the penalties of perjury. The Scotch law of R. of B. is essentially the same as the English. But, in accordance with the law of legitimation in Scotland, it is provided that an entry of illegitimacy shall, on the subsequent marriage of the parents of the child to which it refers, be corrected on the margin by an entry of the marriage. See REGISTRATION OF BIRTHS, DEATHS, AND MARRIAGES.

Births, Deaths, and Marriages. See VITAL STATISTICS.

Birthwort. See ARISTOLOCHIA.

Biru' (*Walata*), a small native state of Sudan, Western Africa, on the S. border of the Sahara, and N. of Bambarra. Its capital, *Walata*, lies 275 miles N.W. of Timbuctu, and has a pop. estimated at above 10,000.

Bis (Lat. 'twice'), in music, denotes that the passage to which it refers is to be played twice.

Bisaccia (supposed to be the ancient *Romulca*), an Italian town in the province of, and 28 miles E.N.E. of the town of, Avellino. Pop. about 6000.

Bisacquino, a town in Sicily, 28 miles S. of Palermo, with an extensive trade in grain and oil. Pop. 8690.

Bisanagar, a town in the Gaikwar's territories, India, situated on the route from Mhow to Deesa, 44 miles S.E. of Deesa. It has considerable trade with Marwar in iron and other heavy goods, and also a considerable manufacture of cotton cloths. Pop. 18,000.

Biscay, or **Viscaya**, the most northerly of the three old Basque provinces in Spain, bounded on the N. by the Bay of B., E. by Guipuzcoa, S. by Alava, and W. by Santander. Area, 850 sq. miles. Pop. (1870), 187,926. The surface is generally mountainous, occupying part of the thickly-wooded and rugged northern slopes of the Cantabrian Mountains, the plains being confined to the lower courses of the streams, of which the Ibaizabal or Nerva is the largest. The climate though humid, from its proximity to the sea, is in general healthy; but the heat in the valleys during summer is almost insupportable. The chief crops are barley, maize, pulse, hemp, and fruits of various kinds; the principal live stock consists of sheep and goats. The inhabitants largely support themselves by fishing, wood-cutting, and mining; iron, lead, alum, and sulphur being found in abundance, and ropeworks, tanneries, and ironworks also giving employment to many. The Biscayans, who are a pure Basque race (see BASQUE PROVINCES), are bold and active, and distinguished for their love of freedom.

Biscay, Bay of (anc. *Mare Cantabricum*, Fr. *Golfe de Gascogne*), the name given to that part of the Atlantic Ocean which lies between the island of Ouessant in France and Cape Ortegal in Spain, washing the N. coast of Spain and the W. coast of France. Extreme length, 400 miles; extreme breadth somewhat less; depth varying from 20 to 200 fathoms. From Cape Ortegal to the western extremity of the Pyrenees the coast is precipitous, with numerous recesses which form convenient harbours; further N. the shore is low and sandy, the mouths of the Adour and Gironde forming the only harbours; but at the extreme N. (Bretagne) it again displays in some measure a broken and rocky character, and has numerous picturesque outlines and excellent havens. The rivers entering the B. of B. from Spain are unimportant; but the Adour, Gironde, Charente, and Loire pour into it more than half the whole river drainage of France. The B. of B. contains the islands Belleisle, Ré, and Oléron. The navigation is proverbially dangerous, from the prevalence of western and north-western winds, which raise high, short, broken waves; and the agitation is increased by Rennel's Current, which runs along the entire coast of the bay. The commerce of the bay, which is considerable, is almost entirely in the hands of the French, the exports being mainly the products and manufactures of France.

Bisceglia, a strongly fortified seaport town on the Adriatic, in the province of Bari, S. Italy, 19 miles N.W. of the town of Bari. B. is the seat of a bishop, and has many churches, convents, &c. Some ruins still exist of the hospital for which it was famous during the Crusades. Pop. (1872) 21,371. The

produce of the neighbouring country consists chiefly of wine and currants, in which latter it rivals the Ionian Islands.

Bisch'of, Karl Gustav, a distinguished chemist and geologist, was born, January 18, 1792, at Nürnberg. He studied at Erlangen, where he first applied himself to mathematical and astronomical studies, but the influence of Hildebrandt soon induced him to devote himself exclusively to chemistry and physics. In 1822 he was appointed Professor of Chemistry at Bonn, and after a life of uninterrupted activity in scientific work died there November 30, 1870. B.'s chief works are, *Die Wärmelehre des Innern unsers Erdkörpers* (Leips. 1837), which appeared in an English form at London in 1841 under the title *Physical, Chemical, and Geological Researches on the Internal Heat of the Globe*; and *Lehrbuch der Chem. und Physik. Geologie* (2 vols. Bonn, 1847-54; new ed. 3 vols. Bonn, 1863-66; suppl. 1871).

Bischweiler (Fr. *Bischwiller*), a town on the Moder, province of Alsace-Lorraine, Germany, 15 miles N. of Strasburg, with which it is connected by railway. It has a trade in hemp, madder, socks, gloves, oil, soap, and an important hop-market. Pop. (1871) 9231.

Biscuits (Fr. *bis cuit*, 'twice baked'), the name applied to thin hard-baked cakes of unfermented, or in great part unfermented, flour. A biscuit essentially consists of a mixture of flour, salt, and water made into dough, and fired in an oven till all the water is expelled, and the flour is turned slightly yellow with heat, when the cake is found to have become hard and firm. This is the simplest form of cooking flour; and as well-baked B. will keep a long time perfectly unaltered, it is a very convenient manner for preparing flour for use at sea, for armies in campaign, and many other purposes. Besides water or ship B., an innumerable variety of fancy B. are manufactured and sold, which differ in size, shape, and the nature of their ingredients. In the composition of fancy B. milk often replaces water, and large quantities of butter, lard, sugar, eggs, and flavouring materials are used. B. are also often rendered porous by the addition of bicarbonate of ammonia to the dough, which, being volatile, is entirely dissipated in the firing process; and the same effect is produced by the addition of baking-soda with sour milk, or by inducing a slight fermentation of yeast in yeast-B. The biscuit manufacture has now become a great industry in the United Kingdom, and many hundreds of workpeople are employed in some of the greater establishments, which export enormous quantities of B. in tins, in addition to supplying a great demand for ship-B., as well as for general consumption. Very elaborate and perfect machinery has been adapted to the manufacture, and mechanical ovens have been introduced for biscuit-baking, through which the goods travel at various rates, entering as raw dough at one extremity, and being delivered as finished B. at the opposite end. The following description of a biscuit factory gives a general idea of the processes in making a water-biscuit.

The flour is, in the first instance, deposited in one of the upper storeys. It passes through spouts or tubes into a lower storey, where the sifting machinery is placed; and after that the flour passes through other tubes to the ground-floor, where it is delivered direct into the hoppers of the mixing-machine for biscuit-making. The machines are arranged in straight lines in front of each oven, and deliver their products into the latter immediately after it has received the proper consistency and form. The first machine in this series is the mixer, or cylindrical vessel of cast iron, in which a number of knives is kept revolving by a central spindle. The cutters are formed like screw-propeller blades, and their action in revolving is therefore a thorough mixing of the mass. The mass from which the dough is formed, say, for ordinary ship-B., is wheat-flour and water; it is delivered from the mixer to the "brake," a machine which is simply a small rolling-mill for rolling a plate of dough, say, 3 feet wide and about 10 feet long, and of the thickness required for the special class of biscuit. This sheet is then delivered to the third machine—the "cutting-machine." This is a somewhat complicated apparatus, operating upon the principle of a multifarious punching-machine, the punches having the regular and irregular shapes of the B. to be cut out of the dough. The cutting-machine faces the stove, and delivers its produce into it, either by the assistance of hand-labour or by a

self-acting apparatus, the latter being the more modern mode. The ovens are about 40 feet in length and 6 feet wide. One oven can produce about 3 tons of ship-B. per day of ten working hours. One cutting-machine is capable of supplying this quantity of cut biscuit-dough, both oven and machine working continuously. The time required for the B. to pass through the oven is about forty minutes; the process of baking evaporates not only all the water mixed with the flour for forming the dough, but also a certain percentage of hygroscopic water held by the flour in its apparently dry state. This loss amounts to 10 per cent. of the total weight of the flour, 10 lbs. of flour yielding only 9 lbs. of baked B.

Biscuits, Meat, are small cakes composed of fine flour and concentrated extract of meat thoroughly incorporated together. They are of American origin, and are designed to preserve for an indefinite time the nutritive properties of meat, 1 lb. of the preparation containing the extract of 5 lbs. of meat, with $\frac{1}{2}$ lb. of flour. They form a valuable addition to the traveller's stores, as they occupy little space, can be eaten dry, or boiled with water to form soup.

Biscuit Ware, a name given to pottery in its unglazed condition, when it is withdrawn from the first firing or biscuit oven. It presents a flat porous surface, and in this state it is frequently used for water-coolers, as red B. W. Parian statuettes and vases, &c., are a form of B. W.

Bish, a celebrated Indian drug and poison, obtained from the dried roots of various species of aconite (*Aconitum ferox*, *A. luridum*, *A. Napellus*, and *A. palmatum*).

Bish'op is the title now given to the highest order of the Christian ministry, who have the same oversight of all the clergy within their Diocese (q. v.) as these have of their flocks. Two rival accounts are given of the origin of this order, or rather a different colouring is given to the same facts, according to the theory held by the writers—Episcopalian or Presbyterian. An attempt is made in the following article to state the facts without any colouring at all.

1. In the New Testament the men appointed by the apostles to superintend the churches they founded, and to carry on the instruction of the people, are called *presbyters* (Gr.) or *elders* (Acts xiv. 23, xi. 30), since age, experience, and character would be essential qualifications for the office (2 Tim. ii. 2), *bishops* (Gr. *episcopoi*) or *overseers* (Acts xx. 28), *leading men* (Heb. xiii. 7), and *shepherds* or *pastors* (Eph. iv. 11). That the titles *B.* and *presbyter* are used synonymously in the New Testament is proved by the following facts: (1) Both titles are applied to the same persons (Acts xx. 17, cf. 28; Tit. i. 5, 7; 1 Pet. v. 1, 2). (2) They are never used together, as if applied to orders distinct from each other. (3) *Bishops* and *deacons* are mentioned as if they comprehended all the officers of the Church (Phil. i. 1; 1 Tim. iii. 1, 8). (4) *Presbyters* discharge duties which properly belong to the *bishops* (1 Tim. v. 17; 1 Pet. v. 1, 2).

2. It is the fact that in the 3d c. there were three distinct orders of clergy in the Church—deacons, presbyters, and bishops. Theodoret says (*Com.* 1 Tim. iii. 1), 'The same persons were anciently called promiscuously both bishops and presbyters, whilst those who are now called bishops were called apostles. But shortly after the name of apostles was appropriated to such only as were apostles indeed; and then the name B. was given to those who before were called apostles.' Here two things are to be distinguished: the fact that at a certain time there was an order of bishops above the presbyters, which is undeniable, and an explanation of this fact—namely, that there had been a regular and uninterrupted succession of apostles, who, very much out of respect for the apostles, came to get a name originally belonging to the second rank of the clergy, an explanation which itself requires to be established. So that the question comes to be, Were there from the first three orders of clergy in the Church—deacons, presbyters (at first also called *bishops*), and apostles (afterwards called bishops)? in other words, was the B. an apostolic and (therefore) divine institution, or was it an outcome of the ecclesiastical tendencies of the time, and a development of the presbyter?

3. *Proof that the B. was an apostolical institution.*—(a.) From the New Testament. The amount of proof claimed from the New Testament is that St Paul appointed Timothy B. of Ephesus

(1 Tim. i. 3, v. 22; 2 Tim. ii. 14), and Titus B. of Crete (Tit. i. 5-10). The worth of this proof to those who have no foregone conclusion on the subject will appear if we consider that the nature of their office is in no way defined by the passages cited than by the duties imposed, which might just as well have been discharged by evangelists. That Timothy was an evangelist is distinctly stated (2 Tim. iv. 5); while his having been ordained a B. seems to be disproved by 1 Tim. i. 3. That Titus was settled as a B. in Crete seems also disproved by Tit. iii. 9-13.

(b.) Coming to the Christian fathers, we find them unanimously testifying that the order of bishops is of apostolic institution. Indeed, so definite is their testimony, that they are able to give the name of the B. ordained by an apostle in each of the principal churches. Nay, Irenæus gives a list of the twelve bishops who had succeeded each other in the see of Rome to his own time: to St Peter, the first B. of Rome, succeeded Linus; to Linus, Clement; to Clement, Anacletus, &c. So the first B. of Jerusalem, ordained by the apostles, was James, the Lord's brother, who was succeeded by his cousin Simeon; of Antioch, Euodius, succeeded by Ignatius—both ordained by the apostles; of Smyrna, Polycarp, the disciple of John, by whom he was ordained (Jerome). According to similar testimony, Timothy was B. of Ephesus, Titus of Crete, and Epaphroditus (Phil. ii. 25) of Philippi. The worth of this as *history* (say the Presbyterians) may be estimated from one case taken as an example—Irenæus's list of the bishops of Rome. Not to mention the discrepancies in the testimony of different fathers regarding that list, every one knows the uncertainty regarding Peter's residence at Rome. That he was ever there, can at the best only be called a tradition. To this, again, the advocates of Episcopacy reply that the discrepancies only prove the inaccuracy of individual memories, and may even be regarded as less suspicious evidence of the common fact whose reality they attest, than any uniform consensus could possibly be. And further, they urge that the testimony (though traditional) in favour of Peter's visit to Rome is such that it is less reasonable to reject than to accept it.

4. An examination of the ecclesiastical tendencies of the time is supposed by Presbyterians to lead to the conclusion that the B. is not a divine—i.e., apostolic—but a human—i.e., ecclesiastical—institution, developed out of the presbyter. The first traces of this development, it is allowed, are apparent in the New Testament. Thus, in the pastoral epistles, while the singular of B. is always used, *presbyters* are always spoken of in the plural, as if it were implied that one of their number acted as president, *primus inter pares*. 'The angels of the churches mentioned in the Apocalypse (i. 20, &c.), if these be, as some suppose, functionaries borrowed from the Jewish synagogue whose name is a Hebrewism for 'ministers,' would point to the same thing. But whatever importance may be attached to these supposed traces of the germ of the B. in the New Testament, there is not (say Presbyterians) a more striking phenomenon in the development of the Church, nor a more undoubted fact in her history, than the gradual formation during the first centuries of a *sacerdotal caste*. Till late in the 2d c., *presbyter* and B. were still synonymous titles. Irenæus and Tertullian mark a transition period, for both sometimes use the names in this way, and sometimes distinguish the B. as president of the presbyters. As late as the 3d c., the presbyters remained as a college of counsellors to the B. Even Cyprian, to whom the episcopal system owes more than to any other individual, apologises both to his presbyters and the laity when he does anything without consulting them. But as early as the time of Tertullian, men had begun to compare the B. with the high priest, the presbyters with the priests, and the deacons with the Levites of the Jewish system. And besides Judaism, which always gets justice, another influence was at work, which is always overlooked, namely, Paganism. Thus the B. (not he of Rome merely) got the name of Pontifex Maximus and many other titles, all to express the honour to be heaped upon him: President, Provost, Inspector, Prince of the People, Prince of the Clergy, Pope, Vicar of Christ. A very significant indication, it is said, of how the B. grew to his full stature is to be found in what was further developed out of the order of bishops, namely, first, Metropolitans (q. v.), then Primates (q. v.), then Patriarchs (q. v.) or Archbishops (q. v.), and finally, a Prince of Patriarchs, the Pope. Even the origin of the inferior orders of clergy is a part of the same thing. For the presbyters, although at first (in the 3d c.) they protested

strongly against the usurpations of the B., soon began to follow in his steps, and the deacons in theirs; which created a necessity for inferior orders—sub-deacons, &c.—to take up the menial duties the higher orders cast off.

But Episcopalians find it quite as easy to interpret the facts in accordance with a belief in the scriptural origin of their own system. They do not affirm that a New Testament B. was, or could possibly be, in power, position, circumstance, &c., what he subsequently became when Christianity spread and the Church grew. Even the theory of his office might become clearer under wider and more difficult conditions, until finally the organisation of an institution that reached to the ends of the Roman empire, and beyond it, might justly be thought to require an expansion of the original conception, which is not necessarily the same thing as the creation of a new order. This view they consider intrinsically more reasonable, and more in harmony with the facts of Church history.

At first bishops were elected by the clergy and the people. Then the Roman emperors reserved the right to themselves. Afterwards the B. of Rome brought it about that the canons in cathedral churches should have the right of election, which, however, had to be confirmed at Rome. Still princes had a certain power in the election of bishops in their own dominions. Especially was this the case in England, where all ecclesiastical dignities were conferred by the King in Parliament, till the right of investiture was given up by Henry I. The right of electing the bishops was confirmed to the chapters by John—the election, however, to be founded on the King's *congé d'élire*, and after to receive his assent.

The Church of Rome has retained, of course, her episcopal organisation. The Reformed Churches, modelled after the Genevan pattern, adopted the Presbyterian system. The Lutheran Church, in some countries, has kept her bishops. So has the Church of England, in which there are twenty-eight, including two archbishops, besides those in Ireland—twelve, including two archbishops—and those in the colonies. There are seven bishops of the Episcopal Church in Scotland. See Bingham's *Ecclesiastical Antiquities*; Neander's *Church History*; Kitto's *Cyclop. of Bib. Lit.*

Bishop, the name given to a pleasant beverage which is made by pouring Burgundy, claret, Medoc, or any of the red wines, cold or hot, on ripe bitter oranges, and regulating the taste of the mixture with sugar and spice. It is drunk hot or cold. Good B. requires excellent wine, and the white of the orange, between the peel and the pulp, must be removed. White wine similarly used instead of red, is called *cardinal*, and Tokay, *pope*.

Bishop, Sir Henry Rowley, an eminent English musical composer, born in London in 1780. He obtained an appointment at the Opera-House in 1806, and from 1808 to 1826 composed incessantly for the two great theatres, among his more popular operas being *Guy Mannering*, *The Miller and his Men*, *Maid Marian*, &c. Later on he conducted the Ancient Concerts for some years; in 1841 was elected Reid Professor of Music at Edinburgh (an appointment which he held only two years); and in 1848 he became Professor of Music at Oxford. Isolated glees and choruses which occur in his operas (e.g., *The Chough and Crow*, *Blow, gentle gales*, &c.) are still deservedly popular, as are also some of his songs. B. died in poor circumstances, 30th April 1855.

Bishop's Stortford, a town of Hertfordshire, on the Stort, 25 miles N. of London by rail, with some trade in grain, malt, and leather. It was the property of the Bishops of London till the 12th c., and formerly possessed a castle. Pop. (1871) 6250.

Bishop's Wal'tham, a town of Hampshire, 8 miles N.E. of Southampton by rail. It has been from the earliest times the property of the see of Winchester, and contains the ruins of a bishop's castle, founded by King Stephen's brother, Henry de Blois, in 1135, and destroyed in the civil war of the 17th c. The Black Act (q.v.) of 1723 was intended to put down the Waltham Blacks, or deer-stealers, who infested a forest in the neighbourhood. B. W. is the election town of N. Hants. Pop. (1871) 2618.

Bisignano, a town in the province of Cosenza, S. Italy, 15 miles N. of Cosenza, contains a cathedral and a castle, and

gives to the Sanseverino family the title of prince. It has some silk trade. Pop. (1871) 4096.

Bis'kupitz, a rising town in the circle of Oppeln, province of Silesia, Prussia, has manufactures of sugar and of iron and steel wares. In the vicinity there are extensive iron and coal mines and smelting furnaces. Pop. (1875) 5733.

Bisley, a town of Gloucestershire, situated on the Severn and Thames Canal, 3 miles E. of Stroud, with some manufacture of coarse cloth. It has a church built in the 14th c., which contains several interesting monuments. Pop. (1871) 4985.

Bismark, or **Bis'marck** (as some branches spell the word), the name of an ancient and noble family of Brandenburg, believed to be of Wendish or Bohemian origin. At a very early period it appears to have founded the village of Burgstall and the petty town of B., in the circle of Stendal, district of Magdeburg, Prussia. In the 12th and 13th c. several members of the family figure as burghers at Stendal and Prenzlau. In 1494 the town of B. was acquired by the lords of Alvensleben, but in 1562 Burgstall was exchanged by Friedrich von B., *Landhauptmann* in the Altmark, for Schönhausen, Fischbeck, Crevese, Briest, &c., belonging to the Brandenburg Elector, Joachim II., and, on account of this barter, is called in the family history *Permutator* (the 'Exchanger'). Friedrich von B. became through his two sons the ancestor of the two still flourishing houses of B., that of Schönhausen in the Magdeburg region, and that of Crevese in the Altmark. Both lines have produced men notable in their day as statesmen and soldiers. **Christoph Friedrich von B.** (died 1704), lord of Schönhausen, was a Prussian general and commandant of Küstrin. **Levin Friedrich von B.** (died 1774) was a privy-councillor and minister of justice under Friedrich the Great from 1746 to 1764. His son, **August Wilhelm von B.** (died 1783), was also a Prussian privy-councillor, minister of war, president of the Board of Trade and Manufactures, and head of the Excise Department. To a Rhenish branch of the Schönhausen line belonged **Friedrich Wilhelm von B.**, who in 1816 was raised to the rank of count in the peerage of Würtemberg. His elder brother, **Freiherr Ludwig von B.**, died 31st March 1816, *Oberhofmarschall* and lieutenant in the service of the Duke of Nassau, and left four sons, all of whom received the rank of count in the Würtemberg peerage, 13th September 1831. To the Schönhausen line also belongs the world-famous statesman Karl Otto von B. Schönhausen (q. v.).

Bismarck-Schönhausen, Karl Otto, Prince von, the greatest German statesman of the 19th c., was born at Brandenburg, 1st April 1814. He studied law at Göttingen, Berlin, and Greifswald, and after having passed his first trials, fell back on the life of a country gentleman. In 1846 he was elected member of the Diet of Prussian Saxony, and of the General Diet in 1847, and soon became marked as an extreme defender of the privileges of the nobility. B.'s eloquence and vigour of character were readily recognised, but he did not then get credit for that sagacity and craft which have since excited the admiration and fear of Europe. He was even thought to be a rash and unwise champion of monarchy and aristocracy; and the *Fortschritt* party (the 'Advanced Liberals') half despised their inveterate foe. But in reality B.'s principles were already fixed; and amidst all the changes of a necessarily tortuous policy, he has never faltered in his strong conviction that a king should govern, an aristocracy control, and a people obey. His contempt for representative institutions is probably as strong to-day as it was twenty-five years ago, though he has for nearly a decade relied for the success of his political strategy on the patriotic sentiments of the German people. B.'s earlier career is now almost forgotten except in Germany, but he was particularly active in the 1848-50 period by his strenuous opposition to the semi-socialistic revolutionists who drew up a 'constitution' for a German empire; he was one of the keenest opponents in the Erfurt parliament of 1850 of the efforts towards union made by the Prussian government; and publicly declared his approval of the reactionary policy of Manteuffel. The new corporation laws, the system of passive servitude, of heritable jurisdiction, and all the pretensions of the feudal party received from B. the most unmitigated support. At this time no one saw in B. more than a daring and passionate Junker. Whether the great idea of consolidating Germany under the leadership of Prussia as early as 1850 was the

master-motive of his action is uncertain. The germ may have been there, but to the outside world he appeared simply a headstrong, overbearing, and narrow-minded Prussian aristocrat. Probably the conduct of the national policy has not only thrust a certain greatness upon him, but also enlarged and ennobled his own nature and aims. At any rate he was a man to be trusted and employed by his sovereign and his party. He became secretary to the Prussian Legation at Frankfurt in 1851, was opposed to Rechberg at Vienna in 1852, and from 1859-62, acted as ambassador at St Petersburg. In 1862, on returning from an embassy to Paris (where Napoleon gave him the Cross of the Legion of Honour), he became Prussian Minister of Foreign Affairs. When his Budget and Army Re-organisation Bill were criticised, he instantly showed the stuff of which he was made by dissolving the Lower Chambers, and concluding a secret treaty with Russia, in spite of the censures of the deputies. In 1864, he forced Austria into the Slesvig-Holstein expedition, and shortly afterwards, by the Austrian war, which ended at Sadowa (1866), he not only obtained for Prussia the rights of Austria in Slesvig-Holstein, but finally excluded Austria from the Germanic Confederation, which was now re-cast, Hanover and Frankfurt being incorporated with Prussia, and the South German States contracting an offensive and defensive alliance with Prussia, whom they also recognised as supreme in military operations. A Federal Council, consisting of delegates from the States, and a Diet elected by universal suffrage, were also provided, and B. became Chancellor of the Confederation, and President of the Council. This is the turning-point in the public estimate of B.'s character and aims. Henceforth he is the pride of his countrymen, who begin to recognise a great patriotic purpose in his policy, and to share his belief that, if a nation is to be powerful, the state (*i.e.*, the governing body) must be strong. The *Fortschritt* party lost its hold on the German people, and everywhere there appeared a *National* party ready to support a minister whose genius already commanded the homage of Europe. Soon after B. obtained the neutralisation of Luxembourg, in place of its cession by Holland to France. Meanwhile it was becoming clear that a great struggle between France and Germany for supremacy in Europe was impending. B., with his allies Von Moltke and Von Roon, secretly prepared for it, and there can be little doubt that, when the proper moment arrived, he deliberately forced it on by the Hohenzollern candidature. After the war (1870) he became Chancellor and Prince of the new German empire. Since then he has actively pursued his great idea of the unification of Germany. His efforts to free education from ecclesiastical control, and to raise its standard, his measures to enforce the authority of the State over that of the Church, in the education of clergy, and in the question of civil marriage, and his determined attack on the Jesuit and Ultramontane party are still in progress, and cannot be adequately judged of. In November 1873, he became Prime Minister of Prussia; on the 13th July 1874 his life was attempted by the fanatic Kullmann, a crime which B. publicly charged the Ultramontane party with instigating; and a great part of 1874-75 was taken up with the trial of Count von Arnim (*q. v.*). Whatever verdict may ultimately be passed on the character and policy of B., he cannot fail to hold a foremost place in European history, and will probably rank as the greatest statesman of the 19th c. See Heseckiel, *Das Buch Vom Grafen* (1869); *Graf B., Ein Charakterbild* (1867); *Reden des Grafen B.* (1867-71); Rosler, *Graf B. und die Deutsche Nation* (1870); and Life by Görlach (Engl. transl., Tauchnitz, 1875).

Bismuth is a crystalline, brittle metal, having a white colour, with a shade in the red. It is first mentioned by Agricola (1529), and was subsequently investigated by Pott (1739), Beccher, Geoffrey, John Davy, and others. It usually occurs in the pure or native condition, and is often found beautifully crystallised. It is found chiefly in Saxony, and requires little other metallurgical treatment than fusion to get rid of earthy impurities. B. is very heavy (sp. gr. 9.8), readily fusible (fusing point, 247° C.), and may be distilled at a high temperature in a current of hydrogen. It may be obtained in beautiful cubical crystals by fusion and partial cooling. Its chemical symbol is Bi, and its atomic weight 210. It dissolves in nitric acid (*aq. fortis*) and in *aq. regia*; but is not attacked by hydrochloric acid. Its alloys with other metals are important, on account of their ready fusibility (*see ALLOYS*), and the property they possess of ex-

panding at the moment of solidification. Some of its compounds are employed in the arts and in medicine. *Basic nitrate of B.*, *trinitrate of B.* or *flake white* (BiONO_3) is prepared by dissolving B. in nitric acid, and precipitating with a large excess of water. *Oxychloride of B.*, or *pearl white* (BiOCl), is prepared in a similar manner, substituting a solution of common salt for the water used to dilute the nitric acid solution. B. forms three oxides— BiO , Bi_2O_3 , and Bi_2O_5 ; two sulphides, BiS , and Bi_2S_3 ,—the latter occurring native as *B. glauc*; a chloride BiCl_3 , and other compounds not having any practical importance.

Bison (*Bos, Bison*, or *B. Europæus*), a genus or species of the ox family (*Bovidae*), represented in Europe by the Aurochs or Lithuanian B., and in America by the American B., a distinct species from the European form—the *B. Americanus* of the naturalist. The European B. formerly abounded over the whole of Europe, including Britain, as proved by the presence of its fossil remains which are found in strata of recent age. At present, it occurs wild only in the Caucasian forests, and is preserved by the Czar of Russia in Bialowieza, a Lithuanian forest. This animal is of very large size, and stands about six feet high at the withers. The back is highly arched, and rises abruptly at the neck, which appears humped from the presence of strong muscular developments. The horns are large, rounded, and tapering. They spread outwards, and curve inwards at the point. Fourteen pairs of ribs exist. The hair on the front of the body and shoulders is long, coarse, and of brown colour, and forms a kind of deep mane beneath the throat. The hair on the other parts of the body is short, and of a dark-brown colour. The long hair of the front part appears to be shed in summer. The tail is tufted. The males are larger than the females, which latter do not possess such shaggy hair in front. These animals appear to be fierce and untamable in their disposition, and they certainly possess immense strength. The European B. may have been the *Urus* of the ancients; altho' some naturalists give the name *Urus* to another ox of large size, which has become extinct within the recent historic period. The *Bonassus* of the ancients in this latter view corresponds to the B.



Bison.

The American B., or Buffalo (*B. Americanus*) is found in numbers at present only in the western prairies of America, although it formerly occurred over the entire area occupied by the prairies. The body of this animal is thickly set; the head being low and the withers high. The head is very large, and, together with the neck and shoulders, is covered by a thick woolly hair of dark-brown colour. This coating acquires a greater length in winter. A hump exists between the shoulders. The rest of the body is covered by short hair, and the tail is short and tufted. These animals appear to migrate southwards in autumn, their most southern limit being in New Mexico, whilst their most northern point of distribution is at lat. 63° or 64°. They are hunted by the Indians, and serve for food to these nomadic tribes, whilst from the skin a variety of useful articles is manufactured. The horns are short and obtuse. These bison fight the wolves with much skill and activity. The flesh and fat constitute the *pemmican* of the fur-traders, and the tallow is also of commercial value. Attempts to domesticate these animals have met with partial success only.

Bissa'o or **Bissa'gos Islands**, a group of about 20 small volcanic islands enclosed by a reef, off the W. coast of Africa, opposite the mouth of the Rio Grande. The Portuguese have a fortified settlement on the principal island, B., and carry on an extensive traffic in slaves. The wealth of the natives consists of cattle and goats, only a small quantity of maize being cultivated, though the soil is fertile.

Bissen, Hermann Wilhelm, a Danish sculptor, was born 13th October 1798, near Slesvig, and studied ten years at Rome under Thorwaldsen, his countryman. He received several important commissions from the Danish Government, was made director of the Art Academy at Copenhagen in 1850, and was appointed by Thorwaldsen in his will to complete his unfinished

works. B. died 10th March 1868. His works are distinguished by vigour and earnestness. Among these are the 'Valkyries,' a 'Venus,' 'Cupid sharpening his Arrow,' a frieze in the great hall of the palace at Copenhagen; and some works commemorative of the national struggle with Prussia.

Bis'ampur, or **Bish'ampur**, a town of British India, in the district of Bankora, division of Burdwan, province of Bengal, on the left bank of the river Bankora, 45 miles W. of Burdwan, and 83 N.W. of Calcutta. It has considerable manufactures of silk and indigo, and an active trade in metal wares, cotton, jute, and fibres. Pop. (1872) 18,047.

Bis'tort, or **Snakeweed** (*Polygonum Bistorta*), a perennial plant of the natural order *Polygonaceæ*, growing in moist pastures and meadows, chiefly in the hilly districts of Europe, Central and Russian Asia, and Northern America, extending into the Arctic regions, but not common in Britain, where it is frequently a straggler from gardens. It is a valuable astringent.

Bis'tre, an artist's colour of a warm brown colour, prepared chiefly from the soot of beechwood fires. It is used only as a water-colour, and chiefly in monochrome sketches.

Bis'tritz, or **Nösen**, a town in the N.E. of Transylvania, on the river B., a tributary of the Great Szamos, one of the branches of the Theiss. It has a Gothic church (1519), with a tower 300 feet high, two monasteries, two hospitals, a large bazaar, and an encircling wall with two bastions and fourteen towers. It had once a great transit trade with Dantzic and the Levant, but its commerce is now limited to the Bukovina. Frequent contests occurred here in 1848-49 between the Austrian and Hungarian generals. Pop. 3451, mostly German Protestants. The district of B. has a pop. of more than 100,000, mostly Roumans and Germans. Its mining, once so important that, according to authentic records, the Tartars in their invasion of 1242 partly slew and partly carried into captivity 40,000 workmen, has in the last century or two greatly declined, and at present is of no importance.

Bisulpur, a town in the executive district of Bareilly, N.W. Province, British India, 24 miles S.E. of Bareilly. Pop. (1872) 9005.

Bites of Rabid Animals. These are very dangerous, not only on account of the local effects, but more especially on account of the constitutional effects which may arise afterwards, as Hydrophobia (q. v.). The treatment consists in fying, where that is possible, a ligature above the seat of injury, or applying compression. This to some extent prevents absorption of the poison. The parts around the wound should be excised as soon as possible; the wound should now be well washed, and afterwards some caustic freely applied. Attention must be paid to the general health until the wound heals. It is only when the animal is really *rabid* that such severe treatment is necessary. Bites from animals not rabid are best treated by soothing applications, as poultices.

Bites of Venomous Reptiles. The serpents provided with poisonous fangs are chiefly natives of foreign countries, only one, the common adder or viper, being a native of this country. The general arrangement of their poisonous fangs will be described in connection with the serpents possessing them. The bite of the common adder is seldom fatal in man. The bites of some foreign species are fatal in a few minutes. Treatment consists in *sucking* the wound freely. This is quite safe if there be no broken skin in the mouth. This may be done by the person bitten, or by a friend. At the same time a ligature is to be tied above the injured part where that is possible. The part may be cut out, and some strong caustic applied to the wound. Internally stimulants are to be given freely, such as ammonia or brandy.

Bithoor, a town of British India, in the district of Cawnpur, division of Allahabad, N.W. Province, on the right bank of the Ganges. It was the stronghold of Nena Sahib during the Indian Mutiny. The fort was burnt by General Havelock after his defeat of the Nena, 16th July 1857. Pop. (1871) 8322.

Bithyn'ia, anciently a country in the N.W. of Asia Minor, extending along the Propontis, the Thracian Bosphorus, and the

Euxine, as far E. as Paphlagonia, and bounded on the S. by Phrygia and Galatia. The Greek poets sometimes called it *Bebrycia*, from its earliest semi-mythical inhabitants the *Bebrycæ*. The chief stream was the Sangarios (mod. Sakaria). Its most notable towns were the Greek colonies, Chalcedon, Heraclea, Myrlea (later Apamea), and Astakos; after whose destruction by Lysimachus Nicomedes I., Nicomedia was founded close by, and became the favourite residence of the kings of B., and one of the greatest cities of Asia Minor. Nicæa and Frusa also flourished along with Nicomedia. The inhabitants, according to their legends, were of Thracian origin. About 560 B.C. they came under the power of Croesus, the king of Lydia, and on the overthrow of the Lydian monarchy, 548, submitted to the Persians. In the 3d c. B.C. B. recovered its independence under native princes, who, however, became quite Grecised in manners and speech. Finally Nicomedes III. (died 75 B.C.) left his kingdom to the Romans, who made it a province. It is particularly memorable as the scene of Pliny the Younger's proconsulship, from which he wrote his famous letter to Trajan regarding the practices of the Christians. Under Diocletian it was the customary residence of the Roman emperor. In the 11th c. it came into the possession of the Seljukide Turks, from whom it was temporarily captured by the Christians during the First Crusade; and in 1326 it was conquered by the Osmanli, who made Prusa (Brusa) the capital of their Asiatic dominions.

Bit'lis, a town of Asiatic Turkey, vilayet of Erzurum, 120 miles S.E. of Erzurum, and 12 miles S.W. of Lake Van, on a river of the same name. The fertile ravine in which it lies is over 5000 feet above the level of the sea. It has an extensive trade, being an emporium for the imports and exports of Armenia and Kurdistan. Its dyes are famous for their brilliancy, and its carpets, of a rich texture, are elegantly and tastefully designed. The bazaars are well stocked and busy. Besides several mosques and Armenian churches, B. has about a dozen monasteries of howling dervishes. Pop. from 10,000 to 12,000, of whom a large number are Armenians.

Biton'to (the ancient *Butuntum*), a town in the province of Bari, S. Italy, about 10 miles W.S.W. of the town of Bari. Along with Ruvo it is a bishop's see, has a splendid cathedral, two monasteries, and a large orphanage. Zagarello, a wine of some reputation, is produced in the district in considerable quantities. Pop. (1872) 24,978. Here, on the 24th March 1734, the Spaniards won a victory over the Austrians which decided the fate of Naples.

Bitsch (Fr. *Bitche*), a town and fort of German Lorraine, 35 miles N. of Strasbourg, at the N. base of the Vosges, and a station on the Hagenau and Saargemünd Railway. It is considered nearly impregnable, being defended by an outer wall, and by a strong citadel built on a high rock, and capable of accommodating a garrison of 1000 men. There are manufactures of porphyry wares, papier-maché, clocks, hour-glasses, and earthenware, and in the vicinity are iron and glass works. B. came to France with the rest of Lorraine in 1738. In the Franco-Prussian war it was unsuccessfully besieged by the Germans, September 11-14, 1870, but was transferred from France to Germany along with part of the department of Moselle, on the conclusion of peace, May 10, 1871. Pop. (1874) 3047, including 650 soldiers.

Bitter Ash, or **Bitter Wood**, the common name in Jamaica for *Quassia* (q. v.).

Bitter Cucumber, or **Bitter Apple** (*Citrullus [Cucumis] Colocynthis*), supposed to be the *wild vine* or *wild gourd* of the Old Testament (2 Kings iv. 39). The fruit furnishes the drastic hydragogue cathartic known as Colocynth. Two kinds are known—*Pealed Colocynth*, from Smyrna, Constantinople, Alexandria, Italy, France, and Spain; and *Mogadore* or *Unpealed Colocynth*, which is obtained from Mogadore. The first is the best, and the kind generally employed in medicine (Bentley).

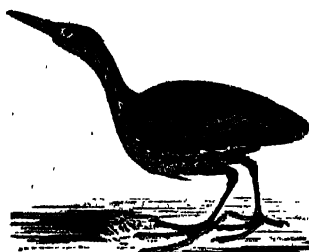
Bitt'ern (*Botaurus*), a genus of *Grallatorial* or Wading birds, included in the Heron family, *Ardeide*. These birds differ from the herons in building on the ground, and among reeds and in swamps, in which they lie concealed during the day. The plumage of the neck is of a detached and loose character.

and can be erected along with the other feathers at will. The back of the neck is bare, or invested by a meagre covering only.



Common Bittern.

The toes are very long, the middle toe especially being much elongated. They are nocturnal in habits, and feed and fly abroad during the night. The cry is sharp, harsh, and of a dismal character. The common B. (*Botaurus stellaris*) is the familiar species. The head is coloured greenish-black; the body plumage being yellowish in colour, mottled with black. It was formerly more abundant than it now is, owing to the drainage of marshy districts. The eggs number 4 or 5, and the young remain in the nest until they are fledged. The B. is a voracious bird, feeding on fishes and on other birds. It is distributed over the Old World. In summer it may be found in N. Europe and Siberia, and in winter it occurs in India, China, and S. Africa. The little B. (*Botaurus minutus*) is less common in Britain, and averages about 13 inches in length. The American B. (*B. Centigonus*) is found in N. America, but has occasionally been found in Britain. Its head is reddish-brown, and its colours are darker than the common British species. The *B. exilis*, or least B., is another N. American species of small size. The Australian B. (*B. Australis*) resembles its British neighbours in habits. The upper parts and head are of a purplish-brown colour; the wings being yellowish-brown or buff; and the throat, breast, and belly being brown with buff markings.



Little Bittern.

Bittern is the name given to the liquor which remains after most of the common salt has been separated by evaporation and crystallisation from sea-water or the water of saline springs. It consists chiefly of a solution of chlorides and sulphates of the bases, magnesium, sodium, and calcium, and also contains minute quantities of bromine and iodine.

In the south of France and elsewhere the extraction of the salts and bromine from B. is carried out on a large scale.

Bitter Orange. See ORANGE.

Bitters, a popular medicine extensively used as a tonic and carminative. B. are prepared by infusing in water some vegetable substance containing a bitter principle, and afterwards straining the infusion. The strained infusion alone should be used. To this infusion some rectified spirit should be added, to prevent the B. becoming putrid. A good proportion is one of spirit to two of water. This will keep for any length of time, and can be diluted when required for use. B. may be prepared from any bitter vegetable substance, such as gentian, bogbean, quassia, chiretta, willow (*salix*), centaury, Columba root, &c. B. are greatly improved by containing some aromatic substances, such as ginger, cinnamon, cassia, or pepper. Some substances contain aromatic properties in addition to bitter principles, and in consequence are held in high esteem for making B. To this class belong angelica and angostura or Cusparia bark. Care must be taken to avoid all plants containing poisonous ingredients, as strychnine bark. B. are best taken before meals, and tend to improve the appetite, promote digestion, and give tone to the whole system. B. are more agreeable, and of more medicinal virtue, when combined with aromatics and carminatives.

Bitter-Sweet, or **Nightshade** (*Solanum Dulcamara*), a plant of hedges and thickets found in moist situations all over Europe, except in the extreme N. In Russian Asia there occurs a variety, or a closely allied species. It is found generally over England and Scotland, though rarer in Scotland. The ovate

red berries are the cause of frequent poisonings, especially of children, who are tempted by their appearance to eat them. The leafless twigs are used as a diaphoretic and diuretic, and as a remedy in skin diseases.

Bitts, in shipbuilding, strong cylindrical pieces of wood or iron about 18 inches high, firmly fixed in the deck for the purpose of securing ropes. In modern ships iron bitts are so constructed as to serve as ventilators for the hold.

Bitumen. Under this name are included a series of substances which differ widely in their physical characteristics, but all of which have a common origin and gradually merge into each other. The bituminous series ranges from the volatile, clear, limpid, hydrocarbon naphtha through petroleum and the thick viscid naphtha to the black, hard, lustrous and glassy asphalt, the series of changes being produced by oxidation and exposure. As the name asphalt is generally applied to a limestone rock strongly impregnated with B., the term B. might properly be reserved for the varieties comparatively free from earthy matter which are employed for making varnishes, such as black Japan varnish, &c. See ASPHALT.

Bituminous Coal, a name given to such kinds of coal as contain a large quantity of organic, volatile, or resinous matters, and which consequently burn brightly, and yield in distillation large quantities of pure gas. They are chiefly used for the latter purpose.

Bituminous Limestones. This term denotes limestones which contain bituminous and resinous matters derived from the decay of organic matter, chiefly of plant kind.

Bituminous Shales, clay rocks occurring in the true coal measures, and which, when mixed with ordinary coal, may burn, owing to the amount of bituminous matters they contain.

These shales, however, even after combustion retain their form, and do not fall to ashes after the fashion of pure coals.

Bitzias, Albert, a celebrated Swiss writer of folk-lore, better known by his pseudonym of Jeremias Gotthelf, born at Morat, Freiburg, 4th October 1797. He was educated for the Church, and was pastor of Lützelflüh, Emmenthal, Bern, from 1832 to his death, 22d October 1854. His first work, *Bauernspiegel* ('The Mirror of Peasants,' Burgdorf, 1836; 3d ed. Berl. 1850), established his reputation. His *Leiden und Freuden eines Schulmeisters* ('Sorrows and Joys of a Schoolmaster,' 4 vols. Bern, 1838; Berl. 1848-49); *Dürstli, der Brantwein-säufer* ('Durstli, the Brandy-Drinker,' Burgli. 1839); *Bilder und Sagen aus der Schweiz* ('Scenes and Legends from Switzerland,' 6 vols. Soloth. 1842-46); *Eraählungen und Bilder aus dem Volksleben der Schweiz* ('Stories and Pictures of Popular Life in Switzerland,' 5 vols. Berl. 1852-55), are all admirable for their fine realism and their healthy morality. A collected edition of B.'s works, in 24 vols., was published at Berlin in 1855-58 (2d ed. 1861). See Manuel, *B. sein Leben und seine Schriften* (Berl. 1857).

Bivalve, the name applied to such molluscous animals as possess shells, which consist of two pieces or 'valves.' Each half of the shell is thus termed a 'valve.' This name, whilst convenient for popular use, is apt to be very misleading in zoology, since there are two groups of *Mollusca* which each possess B. shells, but which in respect of their internal structure and relations are very widely different. These classes are the *Brachiopoda* (q. v.) and *Lamellibranchiata*; the former class being represented by the 'lamp-shells' (*Terebratula*, *Lingula*, &c.), whilst the latter class contains the more familiar oysters, mussels, cockles. The *Lamellibranchiata* are admittedly of higher organisation in most points than the *Brachiopoda*. The shells differ widely, however, in external characters. Thus in the *Brachiopoda*, the valves are placed dorsally and ventrally; in the *Lamellibranchiata* they lie side by side or laterally. In the former the valves are opened and shut by muscles; in the latter, they are shut by muscles but opened by the action of an elastic ligament. The *Brachiopod* shell is equilateral, but inequivalve; the *Lamellibranchiate* shell is inequilateral and equivalve. In microscopic structure the shell of the *Brachiopod* is seen to be made up of numerous flattened prisms, arranged parallel to one another, and at a very acute angle with the shell surfaces; whilst the shell structure itself is perforated by a system

of canals continuous with processes of the *Mantle* (q.v.) which secrete the shell. The Lamellibranchiate shells want this characteristic structure.

The prominent point near which the hinge (formed usually of tooth-like processes fitting into sockets) is situated is termed the *umbo* or *beak*. This beak is placed on the *dorsal* or upper surface of the shell, and points towards the *mouth* or *anterior* border of the shell; whilst the opposite borders are respectively termed *ventral* and *posterior*. Internally, the living shell is lined by the *mantle*, the line along which the mantle is attached being termed the *pallial* line. See also MANTLE, MOLLUSCA, SHELL, &c.

Bivouac (Fr. originally *biuac*, from Ger. *beiwache*, 'bywatch'), a term in the military art introduced during the Thirty Years' War, signifying—(1) the encampment of a whole army during the night in the open air in expectation of a surprise or attack when in the vicinity of the enemy; and (2) any encampment for the night without tents. To secure rapidity of movement, the French revolutionary armies encamped regularly *en B.*, a practice never generally adopted, and now resorted to only in cases of absolute necessity.

Bix'a (*B. Orellana*), the name given by the Indians of Darien to a plant from the reddish pulp surrounding whose seeds is produced the Arnotto or Anotto (q. v.), used to colour chocolate, cheese, and butter.

Bixa, *cece*, or *Flacourtiaceæ*, the Arnotto order (see BIXAL), contains about 96 species, almost entirely confined to the warm parts of the W. Indies and Africa. Some of the plants, on account of their feeble astringency and bitterness, have been used as stomachics.

Biziura. See MUSK DUCK.

Björn'son, **Björn'sterne**, a distinguished Norwegian novelist and dramatist, was born at Kvikne, Oesterdal, December 8, 1832, entered the University of Christiania in 1852, and produced his first drama, *Valburg*, while still a student. Dissatisfied with the state of the theatre at Christiania, he withdrew his play from the managers before they put it on the stage, and devoted himself for a time to vigorous dramatic criticism, by which he did a great deal to improve the national stage of Norway. In 1856 B. went to Copenhagen, where he wrote the greatest part of *Synnöve Solbakken*, a novel which placed him in the foremost rank of Scandinavian writers, and may be said to have begun a new era in the literary life of Norway. From Copenhagen he returned to his native country, where he was for some years manager of the theatre at Bergen, and later of that in Christiania. He edited for a short time, at Christiania, the *Aften-bladet*, one of the leading Norwegian journals. Other novels, each of striking merit, published by B., are *Arne* (1858, translated into English 1866), *A Blithe Boy* (1860), *The Fisher Girl* (1868). They are all vivid pictures of peasant life in Norway. Among B.'s dramas are *Between the Battles*, *Hulda*, *King Sigurd*, and *Mary Stuart in England*.

Björnstjerne's, **Magnus Fredrik Ferdinand, Count**, born 10th October 1779, at Dresden, where his father was then secretary to the Swedish legation, was educated in Germany, and entered the Swedish army in 1793, serving as captain in the Finland war. In 1813 he followed the Crown Prince (Bernadotte) to Stralsund; afterwards fought in the battles of Grossbeeren (23d August, against Oudinot), Dennewitz (6th September, against Ney), and Leipzig; and arranged the capitulation of Lübeck with Lallemand, and the cession of Maestricht. After the Holstein war with Christian Ferdinand of Denmark, B. terminated the Norwegian campaign by the treaty of Moss. He was created a count, and acted as ambassador at London for nearly twenty years. He died at Stockholm, 6th October 1847. B. wrote on political subjects, such as public credit, universal suffrage, and also on Hindoo religion and philosophy. *Engelska Statskrunden* (Stockh. 1833), and *Grunder för Representationens Möjliga Ombyggnad och Förenklighet* (Stockh. 1835), and *Det Brittiska Riket i Ostindien* (Stockh. 1839), are among his chief works. His *Anteckningar* ('Commentaries,' 2 vols. Stockh. 1851) are particularly interesting as contributions to the history of the Napoleonic struggle.

Black, though popularly spoken of as a colour, is really an effect produced by the extinction of all colour; that is, a purely B. surface absorbs all the rays of light which fall on it. B. is

produced when all the three primary colours are mixed in unequal proportions, although in theory equally mixed they should produce a white effect. B., in the symbolism of mediæval art, indicated evil, falsehood, and error, and among modern nations it is regarded as appropriate for the garb of grief and mourning. The principal B. pigments used by painters are ivory-B., bone-B., lamp-B., and beech-B. Brunswick-B. is used for covering cast-iron work, such as grate-fronts, fenders, &c. Blacks in dyeing are produced from logwood, sapan wood, and madder, with strong iron mordants, and there are several aniline blacks.

Black, John, an eminent journalist in the early part of the 19th c., was born in Berwickshire in 1783, his father being a shepherd in the Lammermoors, near Dunse. For some time he was employed in a writer's office, first in Dunse, and then in Edinburgh. After having devoted much time in that city to self-improvement, and especially to the acquisition of ancient and modern languages, he went to London about 1810, and became parliamentary reporter on the *Morning Chronicle*, and subsequently its editor. Under him the *Chronicle* became a most successful journal, and was celebrated for the fearlessness of the opinions it expressed. Retiring in 1844, he lived quietly at Birling in Kent, and died there, June 15, 1855. B. published a *Life of Tasso* (Edinb. 2 vols. 1810), and translated several works from French, Italian, and German; among others, the lectures of the Schlegels on dramatic art, and on the history of ancient and modern literature. He was a shrewd cultured, and kindly man, and was considered in his time to be a model newspaper editor.

Black, Joseph, a proponent of the theory of 'latent heat,' was the son of a Scotch-Irish merchant, and was born at Bordeaux in 1728. He was sent to Belfast for his education at twelve years of age, entered the University of Glasgow when eighteen, and studied chemistry under Dr Cullen. In 1751, he proceeded to Edinburgh to complete his medical curriculum, and took his degree in 1754. In the following year he enlarged the Latin thesis which he read on that occasion, and published it as *Experiments on Magnesia, Quicklime, and other Alkaline Substances*. This paper excited great attention, as it explained the manner in which lime-water acted in alleviating the excruciating pains of stone and gravel. In 1756 B. succeeded Cullen in the chair of Anatomy and Chemistry in Glasgow; and between 1759 and 1763 he evolved his famous theory of 'latent heat.' In 1766 B. again succeeded Cullen as Professor of Chemistry in Edinburgh University. Here his class was always crowded; he paid great attention to the perspicuity of his lectures; but he did nothing to widen further the boundaries of chemical science. B. died November 26, 1799, at the age of seventy-one. His lectures were published (Edinb. 2 vols. 4to) in 1803, with a biographical preface by Professor Robison.

Black, William, a modern English novelist, was born at Glasgow in 1841, and was educated at various private schools. For several years he was exclusively a journalist, and though well known in his profession, could hardly be said to be even the shadow of a name to any considerable portion of the outside public. In 1868, however, appeared his novel *In Silk Attire*, which betokened the possession of exquisite talent, but did not forcibly arrest the attention of the public. There was no mistake, however, about the reception of *A Daughter of Helth* (1871, 11th ed. 1875), which at once placed its author in the front rank of living artists; and since then almost every book he has written, of which the best are *The Strange Adventures of a Phaeton* (1872), *The Princess of Thule* (1873), *The Maid of Killeen* (1874), *Madcap Violet* (1876), and *Masked of Dare* (1878), has confirmed and deepened the impression he made in 1871. Subtle, delicate, and pure in his conception of character, B. is also incomparably graceful and chaste in style, everywhere showing some of the finest qualities of the poet and artist.

Black Alder Bark, or **Winter Berry**, obtained from *Prinos verticillatus* (natural order, *Aquifoliaceæ*). A decoction is used in the United States as a tonic and astringent.

Black Art. See MAGIC.

Black Assize, the name applied to the assize held in the old town-hall of Oxford from 4th to 6th July 1577, because at its close a terrible pestilence broke out, which by August 12th had carried off 510 persons, among whom were the chief digni-

laries who sat on the assize, and most of the jury. The malady, regarded at the time as a judgment from God on the cruelty of the sentence passed on a bookbinder named Rowland Jencks, accused of sedition, may with more propriety be attributed to the filth of the adjoining gaol.

Blackband Ironstone, an iron ore existing in large quantities in the S.W. of Scotland, and discovered about the year 1800 by the late Mr Muschet. It is a carbonate of iron, mixed with clay and sand, and coloured by carbonaceous matter, which forms part of the fuel used in reducing it. It generally contains from 20 to 30 per cent. of metallic iron. Similar ore has since been discovered in Westphalia.

Black Beetle. SEE BLAPS and COCKROACH.

Blackberry. See BRAMBLE.

Blackbird, or **Merle** (*Turdus merula* or *Merula vulgaris*), a well-known species of Insectorial or Perching birds, included in the sub-family of *Turdina* or True Thrushes. The male bird is coloured a uniform deep black, the legs and claws being dusky brown. The bill, eyelids, and mouth are deep orange. The upper plumage of the female is of a dull brown hue, the chin, throat, and upper part of the breast being coloured of a lighter brown; whilst the belly, sides, and under tail-coverts are darker brown. Varieties of the common B. are occasionally met with of a pied or whitish colour. These birds pair early in spring, and are frequently said to pair for life, the male and female being seen together during winter. The nest is built amid thick shrubs, and the eggs, four or five in number, are of a bluish-green colour, spotted with reddish-brown, or they may be destitute of spots entirely. This bird feeds on insects, larvæ, worms, snails, fruits, and seeds. It occurs over Britain and Europe, N. Africa, and the Azores. The cry is cheerful, and these birds appear also to possess considerable imitative powers.

The *Turdus pacilopterus* of Asia is nearly related to the common B. The ring-ouzel (*T. torquatus*), so named from the possession of a white stripe across the breast, is sometimes known as the ring-B.

Black-Boy Gum, or the red resin of New Holland, is obtained from a Grass Tree (q. v.)—*Xanthorrhoea Hastile*. The yellow or Botany Bay resin is probably the product of *X. arborea*. Both resins exude spontaneously from the trunks of the trees, and have a fragrant balsamic odour.

Black Bully, or **Bally-Tree Wood** (*Achras sapota*), a S. American tree, belonging to the natural order *Sapotaceæ*, the wood of which is greenish and very hard, and is used for ship-building, &c. Its bark is febrifugal, and its seeds diuretic and aperient.

Blackburn, a flourishing town of Lancashire, on the Darwen, a branch of the Ribble, 9 miles S.E. of Preston, and 24 N.N.W. of Manchester by railway. It is one of the chief seats of the cotton manufacture, and produces calico, muslin, &c., to the annual value of £8,000,000, having some 110 mills, with 1,500,000 spindles, and employing about 36,000 persons of both sexes. As early as the 17th c. it was noted for the manufacture of what were called *B. checks* and *B. greys*, kinds of linsey-woolsey, and in later times it has been associated with many improvements in the cotton manufacture, chief of which was the invention (1767) of the spinning-jenny by Hargraves, who was born in the vicinity. Of late years the town has greatly improved, and has now many fine buildings, the most notable being the parish church of St Mary's, the Congregational Church, the Town-hall, the Exchange, and the Public Free Library (which contains 20,000 volumes). There are numerous charitable and educational establishments, including a free grammar school, founded by Queen Elizabeth in 1567. On the skirts of the town is the *Corporation Park*, with an area of some 50 acres. Besides having excellent railway communication, B. is connected with Leeds and Liverpool by means of a canal. The town is represented by two members of Parliament. Pop. (1871) of municipal borough, 76,339; of parliamentary borough, 82,928. The district in which B. lies, anciently covered with a vast forest, is now exceedingly populous, and abounds in coal and lime. See Abram's *Hist. of B.* (Blackb. 1878).

Blackcap (*Curruca atricapilla*), an Insectorial or Perching bird belonging to the sub-family of the *Sylvina* or True Warblers, and so named from the jet-black head of the male, which

is covered by feathers, giving the head a slightly tufted or hooded appearance. The females exceed the males in size, and their heads are rust coloured. The back, wings, and tail in both sexes are of an ashy-brown colour; the throat and breast being grey, and the under parts white. These birds are migratory, and arrive in Britain about the middle of April. They fly northwards in summer, even to Lapland, but appear to be permanent residents in Southern Europe. The B. is celebrated for its song, which is hardly inferior to that of the nightingale. It readily survives and sings in confinement. The male assists in incubation, and may sing when sitting on the eggs. The nest is fixed in a low bush, the eggs being five in number, coloured pale greenish-white and spotted with brown. The garden warbler (*Curruca hortensis*), the whitethroat (*C. cinerea*), and lesser whitethroat (*C. sylvicola*) are included in the same genus with this bird.



Blackcap.

Blackcap Titmouse, a name sometimes given to the Marsh T. of Britain, and also to the 'Chickadee' of N. America. (See TITMOUSE.)

Black Chalk, a variety of Clay-Slate (q. v.) containing carbon, and used for drawing and painting purposes. It is found in various places; for instance, the island of Islay, Caernarvon, Spain.

Blackcock, or **Black Grouse** (*Tetrao tetrix*), a species of Ratorial birds, included in the *Tetraonidae* or Grouse family.

The male birds possess a plumage of fine glossy black, with white on the lower wing-coverts, the under tail-coverts, and the bases of the secondary quills of the wing. The tail has a peculiar form, the four outer feathers of each side being long, and curved outwards at their tips, so as to give a double-hooked appearance to the tail. In the females the tail is simple and straight, the colour of the females being pale or rusty brown marked with brown hues. The shanks are feathered. These birds occur in moors, chiefly in Scotland, and particularly in mountainous districts. They are also found on the European continent, on the Alps and Apennines, and in Russia and Siberia. They feed on the twigs of heath, on the leaves and shoots of plants, and on berries. They are gregarious; the sexes in winter, however, keeping in separate flocks. They are polygamous in habits, and pair in spring, but the males take no part in the incubation of the young. The young males resemble the females in the colour of their plumage. The eggs number six or eight, and are of yellowish white colour, spotted with brown, and are each about two inches in length. The flesh is highly esteemed, these birds being considered as typical British gamebirds. Hybrids between these birds and other grouse, or even pheasants, are said to be occasionally produced, although the exact nature of these breeds has not been determined. The average weight of the male B. is 4 lbs., and that of the female about 2 or 2½ lbs.



Blackcock.



Black Grouse (female).

Black Cummin of the Scriptures (Isa. xxvii. 25-27), believed to be the seeds of *Nigella sativa*, natural order *Dilleniaceæ*, or of a closely allied species, the seeds of which are used by the Afghans for flavouring curries.

Black Dammar. See CANARIUM.

Black Death is the name given to the unusually severe epidemics of Oriental plague which visited Europe in the 14th c. Before the B. D. appeared on the coasts of the Mediterranean in 1347, it is said to have ravaged China, India, and Egypt. From Constantinople it spread through Southern and Central Europe and into England in 1348. It may be observed that the battles of Cressy and Neville's Cross in 1346 had relieved England from exhausting wars. Through Sweden and Poland it reached Russia in 1351. In some places—e.g., Avignon in 1360 (where it was observed by the heroic physician De Chauliac), and England in 1361 and 1369—it reappeared. Even Iceland was attacked, and the disappearance of the Norwegian settlements in Greenland has been attributed to this cause. Scotland suffered in 1349, and according to Wyntoun was—

‘Off sa gret wyolens,
That, it was seyd, off lyf and men,
The thyrd part it dystroyd then.’

(See also Macpherson's *Notes* on the passage in the *Cronykil*, B. 8. ch. xlii.) In Europe the B. D. originally appeared in the form of a carbuncular affection of the lungs, accompanied by ardent fever, which carried off the patient in periods varying from twelve hours to three days, the shortest period being that perhaps in Dorsetshire. Latterly, the symptoms described by the Byzantine writers also appeared in W. Europe; the glandular typhus and putrid inflammation of the lungs showing itself in buboes on the arms and thighs (the *gavoccio* of La Mortalega Grande in Italy), black spots or *petechiæ* all over the person, coma, and sometimes intense thirst. It has been conjectured that the resulting mortality in Europe, as a whole, amounted to 25 per cent., while in particular countries it is said to have varied greatly. Thus in Italy it rose to 50, while in France it only reached 10 per cent. In England, Wood states (*History of Oxford University*, 1674) that 90 per cent. perished. This is of course incredible—(see also Stowe's *Survey*, p. 478)—but we know that the price of labour rose so high that Parliament attempted to compel labour at certain prices (37 Edw. III. c. 3).

The B. D. has generally been connected with the great atmospheric disturbances, variously shown in droughts, famines, &c., which took their origin in the Chinese earthquakes of 1333 and following years. The College of Physicians in Paris believed it to have arisen in the form of a mist from the Red Sea, which, again, was caused by a disorder in the heavenly bodies. A more general opinion of the time referred it to the conjunction in the sign of Aquarius of the planets Jupiter, Mars, and Saturn; and the physician Santa Sofia of Padua endeavours to distinguish between the epidemic which is due to general atmospheric conditions connected with astral disturbances, and the enemy which is due to local telluric conditions. The hypothesis of a cosmic alteration of the air is not very intelligible. On the other hand, simple contagion (although it acted extensively without contact) cannot account for the progress of the B. D. We must suppose that, from a variety of causes—e.g., the previous plagues (of which at least six had appeared in the first half of the century), the famines, &c.—a predisposition had been created in many places; and we know that the domestic habits of the age, and the absence of public sanitary regulations, indefinitely multiplied all the risks with which later times are familiar. Purgation, bleeding, and the burning of odiferous wood were among the chief remedies employed by the doctors, some of whom, as Gentilis of Foligno, died of the plague. Generally, however, both priests and doctors fled before the B. D., only some of the charitable orders doing their duty. Popularly, smelling flowers was thought to be a protection. The town of Reggio distinguished itself by its efforts to establish a system of separating the diseased from the healthy; but it was not till long after this that lazarettos were established in Italy. The Catholic Church is said to have gained much money and land, intrusted by desperate owners to its custody. The B. D. also revived in Hungary the Brotherhood of the Flagellants, or Brethren of the Cross, who had first appeared in Italy about 1260, under the name of *Devoti*. Men, women, and children, in great crowds, went roaming through the chief towns of Europe without any more definite object than that of flogging themselves for thirty-four days, or until they should obtain divine grace. These brethren had masters, rules, and a fund. Their pilgrimages, prohibited by the Pope (as also in Germany and France), only resulted in spreading the con-

tagion, which by self-mortification they hoped to escape. The disgraceful *Judenschlacht* (or slaughter of the Jews), in Switzerland, Germany, and elsewhere, was also an indirect effect of the B. D. The Jews were accused of poisoning public wells, but the only evidence in support of the charge was obtained by torture, and was therefore worthless. 12,000 Jews were, however, put to death in Mainz alone. (See Boccaccio, *Decamerone*; Hecker's *Epidemics of the Middle Ages*.)

There appeared in Ireland in 1866-67 an extensive epidemic, distinguished from the more common form of cerebral meningitis by the presence of purple blotches, or patches of effused and dissolved hæmatin, and resembling in other symptoms what has been described above. It was also called the B. D. (See Malpother's 'Malignant Purple Fever in Ireland,' read to the Epidemiological Society of Ireland, July 1867.)

Black-faced Sheep. The range over which these sheep extend, and upon which no other sheep could thrive so well, is a very wide one, extending from Derbyshire on the S. through the counties of Cumberland, Lancashire, Westmoreland, and Yorkshire, to all the Scottish mountains, and they have even penetrated into Orkney and Shetland. The B. S. are very hardy, and are now beginning to supplant the Cheviots on their own hills. They feed on scanty fare, their wool, naturally coarse, has by careful selection been much fined down of late years, and the mutton of a three or four year old B. wether is unsurpassable. The shearing rams bring high prices, as much as £65 having been given for one. Their horns are beautifully curled round their handsome faces, and their general aspect is gay. See *SHEEP*.

Black-Fish (*Centrolophus pompilus* or *moris*), a genus of Teleostean fishes belonging to the family *Scomberidae* or mackerel family, and occurring rarely on the S. coasts of Britain, but more commonly in the Mediterranean Sea, and on the W. coasts of Europe. This fish may attain a length of from 20, to 30 inches, and may weigh as much as 14 lbs. The body is covered with small or minute scales, and one long, low dorsal fin exists. The body is of a black colour, the fins being darkest in hue. No Air-Bladder (q. v.) exists, and the skin is tough. The flesh is said to be very palatable.

Black Flux consists of an intimate mixture of charcoal and carbonate of potash, obtained by calcining *cream of tartar* or bitartrate of potash in a closed crucible. When compounds of easily reduced metals are heated with the flux, the metal becomes separated. B. F. is, therefore, a useful chemical re-agent.

Black Forest (the Ger. *Schwarzwald*, and the *Silva Marcidula* of the Romans), so called from the sombre foliage of its pine-trees, a mountain-chain chiefly in Baden, but also partly in Württemberg, which runs close to, and almost parallel with, the Rhine, from S.S.W. to N.N.E., and is considered by many a prolongation of the Jura range. The rivers rising in it are the Danube, Neckar, Kinzig, Murg, Enz, &c., most of which flow westward into the Rhine. The Feldberg, under 5000 feet, is the highest summit of the chain, of which the greatest length is about 80 miles, and the greatest breadth about 37 miles. The core consists of granite and gneiss, flanked by porphyry, sandstone occurring at the base and along the loftiest ridges. The most beautiful valley is the Murgthal. Among its mineral treasures are silver, copper, lead, and cobalt, and the mineral waters of Baden-Baden have long been celebrated. On the slopes facing the Rhine vineyards and orchards are profitably cultivated; but the rearing of cattle and the manufacture of fancy articles of wood, as clocks, music-boxes, &c., are the principal industries. The Hölle Strasse ('Hell Pass') and the Kniebis Strasse are associated with stirring incidents in the wars of the French Revolution. The inhabitants are simple and quaint in their ways of life, but pure in morals, and very intelligent. A halo of legendary romance and picturesque superstition still invests the region with an indescribable charm.

Blackheath, an extensive common in the county of Kent, 5 miles E.S.E. of London, formerly a noted resort of highway-men, now a favourite place for holiday parties in summer. B. was the rendezvous of the Kentish men in Wat Tyler's rebellion in 1381, and in Jack Cade's in 1450, and has been the scene of many other interesting historical events. Morden College, founded in 1695 for the support of decayed merchants, the free grammar school, erected by Abraham Colfe in 1652, and the

village of B., a station on the N. Kent Railway, and chiefly composed of handsome villas, all stand on the Common.

Black Hell'sbore. See HELLEBORE.

Black Hole, the place in which soldiers guilty of minor breaches of discipline are confined, and hence applied to a police cell, or any place where offenders are temporarily detained. The name has been distinctively applied to a small chamber, not 20 feet square, in the old fort of Calcutta, into which, after the surrender of the place to Surajah Dowlah, Nabob of Bengal, 21st June 1756, there were thrust 146 persons at the point of the sword, 'in one of the hottest nights of the most sultry season of the year.' Only twenty-three were found alive in the morning, and of these, says Macaulay, the ghastly forms could not have been recognised by their own mothers.

Blackie, John Stuart, Professor of Greek in the University of Edinburgh, was born at Glasgow in 1809. His university education, which included a three years' theological course, was received partly at Aberdeen and partly at Edinburgh. He went to Germany in 1829, and afterwards to Rome, and during this visit he devoted himself to the study of German and Italian literature. He passed advocate at the Scottish bar in 1834, but soon retired from the practice of his profession, and became engrossed in literary work, especially in contributing to magazines and reviews. In 1841, B. was appointed Professor of Humanity in Marischal College, Aberdeen, where he remained for eleven years, when he was elected to the chair of Greek in Edinburgh University. During his professorial career, B. has been instant in advocating, by pen and by tongue, the radical reform of the Scottish universities and higher-class public schools; and by his vigorous and effective eloquence he has acquired wide popularity as a public lecturer. In 1874, B. was made convener of the University Council Committee for promoting the foundation of a Celtic chair in Edinburgh University, and advocated the scheme throughout the country, with such enthusiasm and success, that at the close of 1879 the subscriptions amounted to £12,000. His works, of which the following are the chief, are very numerous, and evince the versatility and activity of his mind, as well as the range and power of his scholarship. *Goethe's Faust*, in English verse (1834); *The Lyrical Dramas of Æschylus*, 2 vols. in English verse (1850); *The Pronunciation of Greek* (1852); *Lays and Legends of Ancient Greece* (1857); *Three Discourses on Beauty* (1858); *Lyrical Poems* (1860); *Homer and the Iliad*, 4 vols. (the second and third containing the *Iliad* in English verse) (1866); *Musa Burschicosa* (1869); *War Songs of the Germans* (1870); *Lays of the Highlands and Islands* (1872); *Self-Culture* (1873); *Horæ Hellenicæ* (1874); and *The Language and Literature of the Scottish Highlands* (1877).

Black'ing, as the name implies, is a paste used for polishing black leather, especially the upper leather and the edges of the soles of boots and shoes. Different manufacturers put different substances into the paste with which they supply the market, but the main ingredients of the best B. are animal charcoal, otherwise called Bone-black (q. v.), sperm oil, raw sugar, and a slight infusion of sulphuric acid, which, by converting a large portion of the lime in the animal charcoal into sulphate of lime, thickens the mixture into the requisite pasty consistence. This compound, while it is still warm, is then diluted slightly with vinegar, and the B. is ready to be bottled for the market.

Black'lead, Plumba'go, or Graph'ite, one of the forms in which Carbon (q. v.) occurs native. B. has a metallic, lead-like lustre, and a greasy feel, and is found in Cumberland and other parts of Britain, in Ceylon, Siberia, Bohemia, Bavaria, &c., as well as in many localities of the New World. It occurs in beds or veins in granite, gneiss, and other rocks of early formation. The B. of Borrowdale in Cumberland is a fine-grained variety, and in its purest form contains 88 per cent. of carbon, the remaining impurities being hydrated oxides of iron and manganese, silica, and alumina; it is much valued for the manufacture of lead-pencils. B. is also employed for making crucibles, muffles for counteracting friction, and for giving a polished surface to cast-iron. It is a good conductor of electricity.

Black Letter, the name familiarly applied in this country to the various forms of what is generally known on the Continent as the Gothic letter, which about the close of the 12th c. began to supersede the Roman letter in the writings of Western

Europe. About the middle of the 14th c., B. was in common use in England in the production of MS. works; and when printing was invented a century later, both the block books and those printed with movable types were naturally in this character, and imitated manuscript so perfectly, that it was difficult to discriminate between the printed and the written. The Mainz Bible, known also as the Mazarine Bible, from a copy having been found about the middle of the last century in the library of Cardinal Mazarin in Paris, is an exquisite imitation of manuscript. Books printed before the beginning of the 16th c. are mostly in B. L., though Italy furnishes some exceptions,—e.g., the editions of Pliny's *Historia Naturalis*, printed at Venice by Spira (1469) and by Jenson (1472); but after that date the Roman character came into favour, and in a short period supplanted the Gothic for general purposes. B.-L. books are highly prized by the book-hunter, from their age and consequent rarity. In Germany the Gothic character is still in use, but the Roman character is occasionally employed, especially in printing works in some departments of science, and its use seems likely to become more general. See Hallam's *Literature of Europe*, and Dibdin's *Typographical Antiquities* (4 vols. 1810-19); his *Bibliomania* (1811), and his *Biographical, Antiquarian, and Pictorial Tour in France and Germany* (1821).

Black List, the name familiarly given to printed lists of bankruptcies, bills of sale, records of protests of bills, and other matters affecting the credit of individuals and firms. These are now extensively circulated among commercial men, bankers, and shopkeepers. The legality of publishing such information was at one time disputed, but it has been decided to be lawful to do so, the lists being merely extracts from public registers.

Blacklock, Thomas, D.D., born at Annan in 1721, a preacher and poet, and in both respects somewhat of a phenomenon, being blind from the age of six months. His parents were poor, but conspicuous talent found him a patron, and he studied divinity at Edinburgh University, where he remained till 1745. In the following year he published a volume of pieces in verse at Glasgow (2d ed. Edinb. 1754). In 1764 he finally settled in Edinburgh, where, on a small annuity received in lieu of a church appointment, he cultivated literature till his death, 7th July 1791. The degree of D.D. was received from Marischal College, Aberdeen. B.'s poetry is only mediocre, but he was the friend of Hume and Burns; and it was his appreciative letter in 1786 that prevented the latter from leaving the country. A collected edition of his works, with a biographical sketch, was published by Mackenzie (Edinb. 1793). See also Dr Robert Anderson's memoir in his edition of the British Poets.

Black-Mail, an unauthorised tax formerly levied in the Highlands and on the Borders by certain men who undertook to protect those paying it against the pillage of their cattle, and submitted to in consequence of the impotence of the law. The leviers of this tribute were sometimes themselves caterans or robbers. However, cattle-lifting, so far from being considered dishonourable, was regarded rather as a mark of spirit and enterprise, and the leviers of B.-M. could in many cases boast of ancient blood, and of distinguished and powerful kindred. The most famous specimen of the class was Rob Roy (q. v.). In the *Border Minstrelsy*, Jamie Telfer, who had been plundered of his cattle by the Captain of Bewcastle, is answered by a chief of the Elliots, to whom he had applied for assistance to recover them, 'Gae seek your succour where ye paid B.-M.,' referring to the head of the Scotts, the laird of Buccleuch. The levier of B.-M., when informed of a lifting, either recovered the cattle or paid an equivalent. In *Waverley*, Sir Walter Scott, with his usual graphic power, narrates a case of *harrying or herdsip*, and the recovery of the cattle. The levying of B.-M. in the Highlands ceased after the suppression of the rebellion of 1745, the law thenceforth asserting its supremacy.

Blackmore, Sir Richard, a poet and physician at the courts of William III. and Anne, was born in Wiltshire about 1650. He was educated at Westminster School and Oxford, and took the degree of M.D. at the university of Padua. On his return to England he settled as a physician in London, and was knighted by William III. He died 8th October 1729. B. is notorious for the manufacture of voluminous epics. His persistent dullness provoked general ridicule. Dryden accused him of writing to the 'rumbling of his coach's wheels;' Pope made him outbray all

rivals at the games in the Dunciad; and Cowper said that B. had written more absurdities than any other English author. His chief works are *Prince Arthur*, *Creation*, *The Redeemer*, *Elisa*, *King Alfred*, *The Nature of Man*, *A Satire upon Wit*, *A Paraphrase on the Book of Job*, besides a number of prose works partly professional.

Black Nightshade (*Solanum nigrum*), a plant belonging to the natural order *Atropacea*. It possesses alterative and narcotic properties. Its fruit, as well as that of *S. oleraceum*, are common potherbs in the Mauritius.

Black'pool, a town in the county of Lancaster, on the coast, to the N. of the estuary of the Ribble, 16 miles W. of Preston and 30 N. of Liverpool. It takes its name from a dark boggy pool near the old seat of the Tildesleys, at the S. end of the town. It has no trade or manufactures, but is a celebrated bathing-place, with a pier (extended 1877), splendid sands, and pure bracing air, and is easily accessible by railway. There are fine churches, hotels, libraries, newsrooms, and a theatre. Pop. (1871) 6001, with over 100,000 visitors in the course of the year.

Black Prince, the name by which Edward, Prince of Wales, eldest son of Edward III. (q. v.), is best known.

Black Rod, Usher of the, an officer of the House of Lords appointed by letters-patent. He is a Knight of the Garter, and chief gentleman-usher to the sovereign. His duties are to summon the House of Commons to attend in the House of Peers, and to take into custody any peer guilty of breach of privilege.

Black Rood of Scotland, was a casket-shaped cross of gold, of peculiar sanctity, as containing what was deemed a portion of the true cross set in an ebony figure of the Saviour. It was brought into Scotland about the year 1068, by Margaret, sister of Edgar the Atheling, who was soon after married to Malcolm Canmore. Margaret left it to her children as a sacred heirloom. It was reverently preserved in Edinburgh Castle along with the regalia and the national records, till it was carried off by Edward I. in 1291. That monarch made use of it when he exacted oaths of fealty from the territorial and ecclesiastical magnates of Scotland, who, however, despite the veneration in which the B. R. was held, hastened to break their oaths as soon as they found it convenient. The B. R., restored to Scotland at the peace of Northampton in 1328, became the prize of Sir Ralph de Neville, when he defeated and took captive David II. at the battle of Neville's Cross, in 1346. From that time till the Reformation it was suspended in the shrine of St Cuthbert in Durham Cathedral; but its after history is unknown. See Burton's *History of Scotland*, vol. ii.

Black or Euxine Sea. The earliest Greek epithet for this sea, *Axinos*, the 'inhospitable,' suggested probably by the storms to which it was subject, and the cannibalism of the Thians who dwelt on its shores, was changed into *Euxinos*, 'hospitable,' when its waters were opened to the commerce of Greece: the epithet *Kara* ('black'), given to it by the Turks, expressed their fears of the perils of navigating it, from the incidence of sudden and heavy storms, and the scarcity of convenient ports. The modern Greeks have translated the Turkish name into their own language, *Mauri* (anc. *mauros*, 'dark') *Thalassa*. The B. S. is a large inland sea, separating the southern provinces of European Russia from Asia Minor, and extending from 40° 45' to 46° 45' N. lat., and from 27° 30' to 41° 50' E. long. Its extreme length from E. to W. is fully 700 miles, and its greatest breadth 380 miles; its coast-line exceeds 2000 miles, and its area is 172,000 sq. miles. The Strait of Yenikale connects it with the Sea of Azof, and the Bosphorus, the Sea of Marmora, and the Dardanelles, with the Mediterranean. The depth of water varies from 40 to 1070 fathoms. Like other inland seas, the Euxine has no tides; but it has strong and well-defined currents, caused by the large influx from the rivers, each square mile of its surface receiving the drainage of 54 sq. miles of land. Hence the comparative freshness of its waters, the average specific gravity being 1014, as compared with that of fresh water at 1000, while that of the water of the Mediterranean is 1028. The shores of the B. S. are very varied; in some places low and sandy, in others bold and rocky. The navigation is comparatively safe, there being few islands or rocks. The principal danger is from drift-ice for a part of the year; but this

affects only a narrow fringe in the N., between Odessa and the Crimea. There are few fisheries, owing to the depth of the sea and the absence of shoals and sandbanks. Of the numerous rivers which pour their waters into this sea, the principal are the Danube, Dniester, Dnieper, Bug, Don (Sea of Azof), on the W. and N., the Kuban on the E., and the Kizil-Irmak and Sakaria on the S. Its principal ports are Varna (European Turkey), Braila, in the delta of the Danube (Rumania), Odessa, Kherson, Eupatoria, Sebastopol, Kertch, Azof (Russia), Batum, Trebizond, and Sinope (Asiatic Turkey). In ancient times its shores were the seats of several Greek colonies that carried on a great trade with the mother-country, especially in the products of the East; and it continued to be the scene of commercial enterprise and industry till the overthrow of the Byzantine empire. The Turks excluded all foreign ships from 1453 till 1774, when Russia acquired the right to trade in it; a privilege extended to Austria in 1784, and to France and Britain in 1802. At the close of the Crimean war in 1856, Russian preponderance in the B. S. was carefully guarded against by treaty; but Russia succeeded, at a conference of the contracting powers held at London in 1871, in procuring the abrogation of the restricting clauses.

Black Snake (*Coluber or Bascanian constrictor*), a species of Colubrine snake included in the *Innocuous* or harmless section of that sub-order, and found in N. America, chiefly in the United States, from Louisiana to Connecticut. It attains a length of six feet, and is coloured a glossy black. It is highly active and swift in all its movements, and climbs trees with facility. It feeds on small birds, frogs, rats, &c., and will drink milk and cream. It possesses no poison apparatus, and is said to be readily tamed.

Blackstone, Sir William, an eminent commentator on English law, was born in London, 10th July 1723, educated at the Charterhouse and at Pembroke College, Oxford, and was called to the bar in 1746. In 1749 he was made recorder of Wallingford in Berkshire. In 1753 he gave a course of law lectures at Oxford, which led to his being appointed in 1758 to the Vinerian professorship in that university. The spirit of his lectures was in accordance with the Toryism then dominant in England, and led to B. being made a Q.C., or rather K.C. Other professional honours followed. Having entered the House of Commons (1761) as member for Hindon, he was made Solicitor-General to the Queen. In 1770 he was offered, but refused, the Solicitor-Generalship of England. He was then knighted, and made a Justice of the Common Pleas. B. died 14th February 1780. Though a respectable pleader and judge, he was not sufficiently distinguished to have been long remembered in either capacity. His fame rests wholly upon his *Commentaries on the Laws of England* (1st ed. 1764). It is generally conceded that in these he has succeeded in being eminently lucid—in extracting legal principles from the load of technical language under which they lay hidden and choked; but his want of historical scholarship and his incapacity for scientific thought unfitted him for being in any high sense a philosophic critic of the national legislation.

Black Varnish. That of the Burmese is obtained from *Melanorrhæa usitatissima*, natural order *Anacardiaceæ*. It is anthelmintic. The nuts of *Semecarpus anacardium*, belonging to the same order, is also extensively employed in the manufacture of a B. V., and is the source of the marking-nut.

Black Wad, the native black oxide of Manganese (q. v.), so called by miners.

Black'wall, a suburb in the E. of London, on the N. side of the Thames, 4 miles E.S.E. of the City, with which it is connected by a railway raised on a viaduct above the streets. It contains the E. and W. India Docks, numerous shipbuilding yards and foundries, and is a favourite point of embarkation for passengers who wish to avoid the 'Pool' and Greenwich Reach.

Black Warrior, also known by its Indian name, *Tuscaloosa*, a river formed by the confluence of the Mulberry and Locust, in Alabama, U.S., flows S., and enters the Tombigbee above Demopolis. It is navigable for steamboats for 150 miles. Its basin yields several valuable minerals.

Black Watch, the name of six companies of militia, three of 100 men each under captains, and three of 70 men each under captain-lieutenants, raised chiefly among the Whig clans, the

Campbells, Frasers, Grants, and Munros, about 1730, to watch and preserve order in the Scottish Highlands. The epithet *black* was in allusion to the colour of the tartans in which the men were dressed, and the *sidier dhu* ('black soldier') was an object of fear and aversion to those clans whose chiefs favoured the claims of the Stuarts. The companies, not being connected like those of a regiment, were known as the Independent Companies of the B. W. In 1739, the Highlands being then supposed to have been pacified, the companies were incorporated as the 42d Regiment, with the Earl of Crawford and Lindesay as colonel. A dark arbitrary or fancy tartan, the now familiar 42d, was adopted for the regimental kilt and trews. The B. W. is one of the crack regiments of the British army, its most recent distinctions having been won in the Ashantee war. For an account of its earlier exploits, see Colonel David Stewart's *Sketches of the Character, Manners, &c., of the Highlanders of Scotland, with Details of the Military Service of the Highland Regiments* (Edinb. 1822).

Blackwater, the seventh largest river in Ireland, rises in the W. of Kerry, near Killarney, traverses in an easterly direction the counties of Cork and Waterford, and, after a course of 100 miles, enters the sea at Youghal harbour. It passes the towns Millstreet Mallow, Fermoy, Lismore, and Cappoquin, flows through a well-wooded and beautiful region, abounds in salmon, and is navigable to barges for about 15 miles. B. is the name of other four rivers in Ireland, the chief of which, rising in the W. of Fermanagh, flows E. through Monaghan, and then N.E. to Lough Neagh, forming the boundary between Armagh and Tyrone. The prevalence of the name in Ireland, both in its English and Gaelic forms, is explained by Joyce (*Irish Names of Places*, 2d ser. 1875, p. 261) by the great extent of bog-land.

Blackwell, Alexander, M.D., was born in Aberdeen about the beginning of the 18th c., studied physic under Boerhaave at Leyden, where he graduated, and afterwards became a printer in London, but was thrown into prison for bankruptcy in 1734. His release was effected by his admirable wife, who, having a talent for drawing, published a *Herbal*, which was patronised by the College of Physicians. The first vol. appeared in 1737, and contained 252 plates; the second in 1739 with 248 plates. It was then published in a complete form, under the title, *A Curious Herbal, containing 500 cuts of the most useful Plants which are now used in the Practice of Physic, engraved in folio copper-plates, after drawings taken from the life by Elisabeth Blackwell*. In 1740 B. removed to Sweden, where he enjoyed court favour till 1748, when he was accused of plotting against the king and government, condemned and executed, August 9, 1749. His works, both English and Swedish, treat specially of agriculture.

Blackwell, Elizabeth, M.D., the first female that ever obtained a doctor's diploma, and at present a practitioner in New York, U.S., was born February 3, 1821, at Bristol, where her father was a sugar-refiner. The family removed to the United States in 1832; and on the death of the father at Cincinnati in 1838 she opened a boarding-school, which soon gained a wide-spread reputation. After some time, however, she resolved to become a physician, and, with this end in view, passed through her preliminary studies at Asheville and Charleston, supporting herself in the meantime by teaching music. She then studied anatomy and midwifery privately under Professor Allen and Dr Warrington of Philadelphia, having vainly sought admission as a student into more than a dozen medical schools. After strenuous efforts, she obtained admission into Geneva University, New York, in 1847, and graduated in 1849. After visiting the London and Paris hospitals for a year and a half, she returned to America, and established herself in New York in 1851. In 1857 she opened an hospital for women, over which she presided, assisted by her sister, Dr Emily B., who graduated in 1854. In 1859 she paid a second visit to England, and delivered a course of medical lectures. She has published several professional works of considerable merit.

Blackwell, Thomas, LL.D., brother of Alexander B. (q. v.), was born at Aberdeen, August 4, 1701, graduated as M.A. in the university of that city, became Professor of Greek in Marischal College in 1723, and Principal of the University in 1744. B. died at Edinburgh in February 1757. His works are *An Inquiry Into the Life and Writings of Homer*

(1735), *A Key to the Inquiry* (1736), *Letters on Mythology* (1748), and *Memoirs of the Court of Augustus* (3 vols. 1753, 1755, 1764, the last being incomplete).

Blackwood, one of the commercial names for E. Indian rose-wood (*Dalbergia latifolia*, natural order *Leguminosae*).

Blackwood, William, a distinguished Scottish publisher, was born at Edinburgh, November 20, 1776. Passing through an apprenticeship to the bookselling trade, he became (1804) a bookseller on his own account in Edinburgh, and finally, in 1817, a publisher. In the same year he issued the first number of the celebrated magazine which bears his name. Gathering round him some of the ablest literary men of the day, including Wilson, Hogg, and Lockhart, B. instantly achieved success. Till his death, September 16, 1834, B. was the leading spirit of the magazine, of which there was never a sole and irresponsible editor. As a political organ of the Tory party it was long a power, and at first a terror. But its *forte* was literature; and if the 'sound of revelry by night' was in the old days too loudly echoed in its pages, it has now completely died away. Yet it has not lost, but only changed its spirit. Under the successors of 'Ebony,' *Blackwood* maintains its position in the face of numerous and formidable rivals, and is still admirable for the various talent it commands.

Bladder, Diseases of. The B. is liable to a number of diseases, the most important of which are—1. *Inflammation of the B.*—This may be either acute or chronic, technically called *Cystitis*. The acute form may be limited to a portion of the B., or involve the whole organ. It may be caused by cold, by inflammation extending from neighbouring parts, by a calculus in the B., by external violence, or by irritating injections. *Symptoms*—Shivering, pain in the region of B., pain in passing water, which is passed frequently, and in small quantities. There is generally high fever, with much constitutional disturbance. The treatment consists in applying soothing poultices over the region of the B., especially poppy-heads and linseed meal, hot hip-baths, gentle aperients, such as castor oil, in small doses. If there be retention of urine, it must be drawn off by the surgeon. The diet should be light, as milk, or root, barley-water, and mucilaginous drinks. All stimulants are to be avoided. Opium and belladonna are to be freely used, especially as Suppositories (q. v.). During the whole time, perfect rest must be maintained. In *chronic* inflammation of B. the symptoms are not so severe. It often occurs in old people, and here the cause must be ascertained; and if depending on a stone or calculus, it must be removed; if due to the state of the urine, that must be remedied. This disease is sometimes called *catarrh of the B.* Infusion of Uva-ursi (q. v.) and Bucku (q. v.), combined with belladonna or henbane, will often prove beneficial. Barley-water and linseed tea are also both good. When the pain is severe, opium or belladonna must be given.

2. *Paralysis of B.*—This is a common disease in the aged. It is often due to over-distension of the B., brought on by cold, or by being prevented from some cause from passing urine for a long time. In this case the urine generally dribbles constantly, and it is often mistaken for incontinence of urine. This mistake has often led to most serious results. The treatment consists in passing the Catheter (q. v.), and withdrawing the urine. This must be repeated two or three times a day. This state often continues for weeks before the B. regains its strength. When due to disease of the nervous system, it is often permanent. P. of B. frequently follows injuries, especially of head and pelvis. In some cases iron, strychnine, and other tonics may be given.

Irritability of B. may be due to disease of kidneys, B., or some other organ in that region; to piles, to pressure of the uterus, or a tumour; to worms in the rectum (a common cause in children), or it may depend on some morbid state of the urine. *Symptoms*—Constant desire to micturate, and a general uneasiness in the region of the B. *Treatment* consists in removing the cause, rest, attention to diet, avoidance of all stimulants, mucilaginous drinks, and iron tonics where there is debility. Belladonna is a most valuable medicine in such cases, and very specially in the irritability of B. in children.

Bladder, Urinary, is a membranous and muscular sac, which receives the urine poured into it through the Ureters (q. v.)

from the kidneys, and retains it until it is expelled from the body through the Urethra (q. v.). Its position varies according to its state of distension. When quite empty it lies deep in the pelvis, and when distended with urine it reaches above the pubes into the abdomen. In infancy it is more elongated, and extends much higher into the abdominal cavity.

Structure of B.—It is composed of three coats—a serous, a muscular, and a mucous coat. The serous coat is a portion of the Peritoneum (q. v.), and covers only the posterior and upper half of the B. The muscular coat lies beneath the serous coat, and is composed of three distinct layers, and it is owing to these muscular fibres that the B. owes its contractility, which enables it to expel its contents. The internal covering is called the *mucous* coat. This is sometimes described as composed of two coats—the cellular and mucous membrane. The so-called *cellular* coat is composed of a layer of areolar tissue lying between the muscular coat and the mucous membrane. The mucous membrane is 'soft, smooth, and of a pale rose colour.' It is continuous with the mucous membrane of the urethra and ureters. It is covered with an epithelium intermediate between the columnar and squamous varieties. The mucous membrane over the greater portion of the B. is loosely attached to the cellular tissue beneath it, and in consequence, when the B. is empty, is thrown into folds. At one portion of the B. the lining membrane is closely adherent to the subjacent tissue, and is never thrown into folds. This is at the base of the B., is triangular in shape, and has been called the *trigone* of the B. The apex of this triangle is in front, immediately behind the urethra, and its base is behind, the two angles of which correspond to the openings of the ureters. This portion of the B. is uncovered by peritoneum, is in contact with rectum in the male, and is the portion through which the surgeon punctures the B. when this operation is performed from the bowel. There are three openings into the B.—the mouths of the two ureters through which the urine flows into the B., and the entrance into the urethra, through which the urine passes out of the B.

Bladd'er Oampion. See SILENE.

Bladd'er Green. See BLACKTHORN.

Bladd'erlocks, Henware or Honeyware, a local name applied to *Alaria esculenta*, a species of seaweed found abundantly on the shores of Great Britain. It is sometimes eaten.

Bladd'er-Nut (*Staphylea*), a genus of plants which, in combination with *Euscaphis*, is by some botanists considered the type of the small natural order *Staphyleaceæ*, containing 14 species. They are mostly shrubs. The bark of some of them is bitter and astringent, while others, like *Staphylea*, have somewhat purgative seeds.

Bladd'erwort (*Utricularia*), a genus of *Lentibulariaceæ* (q. v.), found in ditches, lakes, and marshes in all parts of the world, including Britain, of which three species are natives. Some of the leaves are transformed into *utricles* or bladders, which float the plant to the surface during the flowery season. Insects are sometimes imprisoned in these utricles, and it has lately been debated whether these insects do not contribute to the food of the plant. (See DIONÆA, DROSER, and NEPENTHES.)

Blad'ensburg, a post-town of Maryland, U.S., on the E. arm of the Potomac, 6 miles N.E. of Washington, and the scene of a victory won by the English under General Ross over an inferior force of Americans, August 24, 1814.

Blae'berry. See WHORTLEBERRY.

Blaeu, or Blaeuw, the patronymic of a family of Dutch printers and publishers, distinguished by their learning, and by the elegance and general correctness of their publications.—**Willem B.**, born at Alkmaar in 1571, a friend and disciple of Tycho Brahe, acquired a high reputation as an astronomer and geographer, and as the constructor and publisher of a terrestrial and celestial globe of remarkable beauty and correctness. His own works are *Zee Spiegel* (1627 and 1643); *Onderwijs van de Hemelsche en Aardsche Groten* (1634); a *Nouus Atlas* (6 vols. 1634–62), partly published by his sons; and a *Theatrum Orbium et Munimentorum* (1619). After his death, October 21, 1638, the business was conducted by his sons Jan and Kornelis,

the latter of whom died in 1650.—**Jan B.**, born at Amsterdam in the beginning of the 17th c., published his *Atlas Magnus* in 11 vols. (1650–1662; French, 12 vols. 1663; Spanish, 10 vols. 1669–72), a magnificent work, the details of which were furnished for the several countries by learned natives. He was an enterprising man, and entered into important speculations in conjunction with foreign publishers, having an establishment even at Vienna. He died 28th December 1673, after which the business was carried on by two of his sons, Jan and Pieter, with distinction and success till about 1700.

Blain'ville, Henri Marie Ducrotay de, a celebrated French anatomist and zoologist, was born at Arques, near Dieppe, September 12, 1778, and graduated at Paris in 1808, where he soon attracted the notice of Cuvier, who chose him for his assistant in the Collège de France and the Athénée, and in 1812 secured for him the chair of Anatomy and Zoology. Soon after a quarrel broke out between the master and disciple, which found melancholy expression in their scientific papers. Cuvier ignored B., and B. declared that Cuvier's labours were of no value. Nevertheless, in 1832, he succeeded Cuvier as Professor of Comparative Anatomy in the Museum of Natural History, and died May 1, 1850. B. was a devoted and enthusiastic *savant*. If he did not create a science, like Cuvier, he immensely extended one by his observations and experiments. His principal works are *Faune Française* (1821–30); *Manuel de Malacologie et de Conchologie* (1825–27); *Ostéographie* (Par. 1839–49); and *Histoire des Sciences Naturelles au Moyen Age* (Par. 1845).

Blair, Hugh, a Scotch theologian and rhetorician, more esteemed in his own than in our time, was born at Edinburgh, April 7, 1718. Educated at Edinburgh University, he was licensed to preach in 1741. His career was very successful, and he filled in succession the charges of Colleslie in Fifeshire, Canongate Church in Edinburgh, Lady Yester's, and finally (in 1759) the High Church in the same city. The literary style of his sermons was much admired, and when the chair of Rhetoric and Belles-Lettres was created in the University of Edinburgh, he was appointed, in 1762, professor. In 1780 he received from George III. a pension of £200 a year, retired from his professorship in 1783, and died December 27, 1799. Both his sermons and his lectures as Professor of Rhetoric were published, and obtained a high reputation. They were translated into almost every language of Europe, and everywhere held in the highest honour. It is almost ludicrous to see a great original genius like Jean Paul quote B. as an authority. Yet they are still pleasant reading,—the former as moral essays, the latter for their clear, if thin, style.

Blair, Robert, a Scotch poet and divine, the son of the Rev. David B., was born at Edinburgh in 1699. He was educated for the Church, and from 1731 till his death, February 4, 1746, was minister of the parish of Athelstaneford. B. is best known by his gloomy but powerful poem of the *Grave*, which was illustrated by the gifted and eccentric artist William Blake. Although he looked upon life from the serious point of view, he was a man of many accomplishments and a keen botanist. His fourth son, Robert B. of Avontoun, became Lord President of the Court of Session.

Blair, Robert, a noted Presbyterian divine, was the son of John B. of Windyedge in Ayrshire, and was born at Irvine in 1593. He studied at Glasgow, was licensed to preach in 1616, and, after several vicissitudes, was settled at St Andrews. In 1640 he accompanied the Scottish army to England, was conspicuous in the prosecution of the adherents of Montrose after Philiphaugh, was appointed one of the divines who were sent (1645) to Newcastle to reason King Charles out of Episcopacy, and in 1648 was employed by the Church to treat with Cromwell for uniformity of religion throughout the island. At the Restoration he was deprived of his parish, and forbidden to preach. B. died at Meikle Couston, near Aberdour, 27th August 1666. He was a man of considerable force, but altogether too narrow to be remembered with much pleasure. Robert B. (q. v.), the author of the *Grave*, was his grandson, and Hugh B. (q. v.) was a great-grandson.

Blair-A'thol (the 'battle-field' of Athol), a small village in Perthshire, Scotland, at the confluence of the Till and Garry, 30 miles N.N.W. of Perth, near which is Blair Castle, the seat

of the Duke of Athol. The largest and oldest larch-trees in Scotland are to be found here.

Blair-Gowrie (the 'battle-field' of Gowrie), a small town in Perthshire, on the Erich, 16 miles N.N.E. of Perth, with some industry in flax-spinning and weaving. It lies picturesquely at the E. base of a range of hills, and is connected with Cupar-Angus by a branch railway. Near it fine white marble is quarried. Pop. (1871) 4832.

Blake, Robert, a great English admiral, was born at Bridgewater, Somersetshire, in August 1598, and was educated at Wadham College, Oxford. In the struggle with Charles I., he heartily threw in his lot with the Puritan and Republican party, and earned such distinction by his heroic defence of Taunton in 1644 that he was appointed to the command of the fleet which the energy of Parliament and the policy of Sir Harry Vane, who wished to create in the navy a force that might neutralise the army, then beginning to be troublesome to the Parliament, had called into existence. B. found the sea to be the proper element for his genius as well as patriotism. He destroyed the fleet of Prince Rupert in the harbour of Malaga, after having pursued it from Kinsale in Ireland. In 1652 and 1653, by a series of brilliant and desperate engagements, in only one of which he was beaten (from being outnumbered), he established the naval supremacy of England—destroying that of Holland, and defeating her chief admirals, De Ruyter and Van Tromp. In 1654 he was sent to the Mediterranean. He destroyed the capital of Tunis, beat a Turkish fleet, and set free the English detained as slaves at Algiers. In 1657 he gained a great victory over the Spaniards, forcing his way into the harbour of Santa Cruz, in Teneriffe, burning the galleons there, and working his fleet out with only the loss of one ship and 200 men, in the face of a heavy gale. His health had, however, given way, and he died, August 27 of the same year, while the fleet were entering Plymouth Sound. Cromwell honoured his remains with a public funeral in Henry the Seventh's Chapel; but after the restoration of Charles II., they were thrown into a pit in St Margaret's Churchyard. B. was a man of the highest character, honesty, and piety, as well as patriotism, and he raised British seamanship to a reputation which has never left it. See Hepworth Dixon (assisted by Lord Dundonald), *Robert B., Admiral and General at Sea, based on Family and State Papers* (Lond. 1852).

Blake, William, a great erratic genius and mystic, the author of a number of exquisite lyrics, and of many designs, chiefly allegorical or symbolical, betraying a lofty but peculiar imagination, was born in London, November 28, 1757, and was apprenticed in 1777 to an engraver. In 1783 he published his *Portraiture Sketches*, but which were written previously to and during the year 1777. In 1789 appeared his *Songs of Innocence and of Experience*, accompanied by sixty-five plates, both designs engraved and poems hand-printed upon copper by a secret process (revealed to B., according to his own account, by the spirit of his brother), and the specialty of which was, that when the uncovered parts were eaten away by acid, the design remained as in stereotype. Others of his works are the *Gates of Paradise* (16 plates); *Urien* (27 plates, 1794); *Jerusalem* (100 plates). He also illustrated the *Night Thoughts* and *Blair's Grave*; and his *Illustrations to the Book of Job* are among his best efforts. B. died August 12, 1828. He was the admired friend of Flaxman the sculptor; Mrs Jamieson writes of his conception of angels as in the highest degree pure; Charles Lamb speaks of his work as executed 'with wonderful power and spirit,' and of B. himself as 'one of the most extraordinary persons of the age;' and A. C. Swinburne says of him, that he was 'the single Englishman of supreme and simple poetic genius born before the closing years of the 18th c. ;' the one man of that date fit on all accounts to rank with the old great names. See *Life of William B.* by Alexander Gilchrist (Lond. 1863); and *William B., a Critical Essay*, by Algernon Charles Swinburne (Lond. 1868).

Blanc, Jean Joseph Louis, a notable French politician and socialistic philosopher, of Corsican extraction, was born at Madrid, October 28, 1813. After being an attorney's clerk and a tutor, he established himself in Paris as a writer on politics and literature, and unfolded a system of socialism in the *Revue des Progrès Politiques, Social, et Littéraires*, which he established in 1838. In 1840 appeared his most important

socialistic work, *Organisation du Travail*, in which he advocated the absorption of the individual in a great 'solidarity.' This book gained B. a high reputation in Paris, especially among the working-classes, by the brilliancy of the style, and the thoroughness and simplicity of the schemes proposed. By his political writings, and particularly his *Histoire de Dix Ans*, 1830-40, he did much to hasten the fall of Louis Philippe in 1848, and after the February revolution became a member of the Provisional Government. Subsequently, getting mixed up with attempts to forcibly carry socialism into practice, B. fell under the suspicions of his colleagues, and, had he not escaped to London after the June insurrection, would probably have been thrown into prison. He lived in London, writing on politics and history, and with equal ease, apparently, in French and English, till the fall of the Second Empire. He returned to France in 1870, and has since been gradually regaining a political position; but is apparently as eager as ever to reconstruct society. His chief work is his *Histoire de la Revolution Française* (1st vol. Par. 1847), which is still unfinished. His historical knowledge is great, and he is a dignified and eloquent writer; but though his enthusiasm and earnestness are beyond suspicion, and his intellect is singularly clear and logical, he has not impressed his contemporaries with a belief in his wisdom or insight. B.'s latest work is *Dix Ans de l'Histoire d'Angleterre* (Par. 1879).

Blanc, Le, a town in the department of Indre, France, on the Creuse, 55 miles S.S.W. of Tours, formerly fortified; with some trade in wine, lace, iron, timber, and hardware. It has several old castles, and a Roman church of St Genitour. Pop. (1872) 4332.

Blanc, Mont. See MONT BLANC.

Blanc-Mange (*blanc*, 'white,' and *manger*, 'to eat'), a white jelly, made principally of milk and isinglass. The following is a very simple recipe for making B., but it is only one of many:—Dissolve half an ounce of isinglass in three gills of milk; add four well-beaten eggs, and the peel of two lemons rubbed in a few lumps of sugar; sweeten it to taste, and stir it over a slow fire until it is on the point of boiling; add a little brandy, if liked, and pour the whole into a mould.

Blanching, or *Etiolation*, a process, natural or artificial, by which leaves and succulent stems of plants are in growing kept pale and watery by exclusion of light from their growing surfaces. The natural process is seen in cabbages, and other 'heart'-forming vegetables, where the inner leaves are tender and white. B. is produced artificially by earthing up around growing shoots, by tying leaves together, or by covering over with an inverted flower-pot, or a special B.-pot. The plants chiefly blanched for table use are celery, seakale, and asparagus; but rhubarb, chardoon, endive, and various salad plants are also artificially blanched. B. prevents the elaboration of chlorophyll, and the secretion of acrid juices, besides preventing the formation of hard, indigestible, woody fibre within the parts operated upon.

Blanche-Lyon, a *pursuivant-at-arms* in England. See PURSUIVANT.

Blanc's Cape (*i.e.*, 'white cape'), the name of various promontories, the chief of which are in Africa, America, Spain, Greece, and the Philippines. There are two in Africa, one in Tunis, which is the most northerly point of the continent, and the other on the W. coast, forming the Great Bay, a large natural harbour, about 390 miles N. of Cape Verde. Cape B. in Peru is the most westerly headland in S. America.

Blandford-Forum, or **Market-Blandford**, a town of Dorsetshire, on the Stour, 16 miles N.E. of Dorchester, and 103 S.W. of London by rail, with horse, cattle, and cheese markets. It is a very old place, and was a market-town in the 13th c. It was partly destroyed by fire six times (1579-1731), and on the last occasion was rebuilt with the aid of public subscription. At one time B. produced the finest point-lace in England, and also large quantities of shirt-buttons, before pearl was used in the manufacture. Pop. (1871) 4011. Creech, the translator of *Lucretius*, and Archbishop Wake, are among its more distinguished natives.

Blandrata, Giorgio, an Italian physician, was from 1544-51 in the service of Isabella, mother of Johann Sigismund II. (Zapolya), King of Transylvania. Persecution on account of his Arian

opinions drove him from Pavia, Geneva, and Poland, back to Transylvania, where he became court-physician, and, in 1564, President of the Synod of Enyed. With the help of Francis David, a Unitarian preacher, and of the King, B. secured toleration, and soon after a wide diffusion, for Unitarian principles in Transylvania. On the accession of Christoph Bathori (1571), a Catholic, B., having quarrelled with David (then superintendent of the church at Klausenburg) about the duty of prayer to Christ, after a public discussion at which Faustus Socinus assisted, procured the disgrace of David, and the punishment of all who denied this duty. B. died at Gyula Fejervar, in 1588. In Poland (which B. revisited under Stephan Bathori) he had from 1558-63 been attacked by the letters of Calvin, and exposed to the suspicions of the orthodox party (See Wallace's *Antitrinit. Biography*, ii. p. 140; Bayle's *Dictionary*; Lange's *History of Reformed Church in Hungary and Transylvania*, 1728, p. 116).

Blane, Sir Gilbert, an eminent physician, born in Ayrshire, August 29, 1749, and educated at Edinburgh. In 1780 he accompanied Lord Rodney as his private physician when he took the command of the W. Indian fleet; was appointed physician to St Thomas's Hospital, London, in 1785, and ten years later head of the Navy Medical Board. In 1812 he received a baronetcy, and was physician successively to the Prince Regent and to William IV. B. died June 27, 1834. His principal service to the navy was the introduction of the use of lime-juice, which has nearly extirpated scurvy from the fleet. Among many valuable professional works, his *Warning and Admonition to the British Public on the Introduction of the Cholera of India* (Lond. 1832) may be mentioned as having been opportune and salutary.

Blan'es, a Spanish town in the Mediterranean province of Gerona, 21 miles S. of the town of Gerona, and 32 miles N.E. of Barcelona, with which it is connected by railway. Pop. 5000.

Blank Bonds were, in the practice of Scotch law, bonds in which the name of the creditor was left blank. They passed like bills by mere delivery; the bearer being at any time at liberty to fill up his name and to take action for payment. Being found to facilitate fraud, B. B. were in 1696 made null by Act of Parliament.

Blank Cartridges. See CARTRIDGES.

Blankenburg, a walled town in the Duchy of Brunswick, on the northern slope of the Hartz mountains, 38 miles S.S.E. of the capital, is the chief town of a circle of the same name. It has a pop. (1871) of 3853, chiefly engaged in mining. Overlooking the town, on the Teufelsmauer, is a palace belonging to the Duke of Brunswick, and at a short distance are the remains of a large castle hewn out of the rock by Henry the Fowler in 919. The district is noted for its fine fruits.

Blank'ense, a beautiful village on the right bank of the Elbe, about 4 miles from Altona by rail, is a favourite residence of the Hamburg merchants. It nestles picturesquely among the knolls and gardens on the steep bank of the river, which is here fully a mile wide, while from Sandhill (*Blanke nase*, 'bare nose') a splendid view can be got stretching away to the sea. B. is the headquarters of the North Sea fishermen and the Elbe pilots, and has, although without a harbour, some 300 craft. Pop. (1871) 3321.

Blank Verse, strictly defined, is verse *without rhyme*, and irrespective of the *length* of the line. In this sense it is applicable to the Greek and Roman epics, which are in hexameter; to Italian dramatic verse, which consists of eleven syllables; to German and English non-rhyming epic and narrative verse, in which the line may be of any length, from that of *Ilíawatha*, which contains six, to that of *Evangeline*, which contains sixteen syllables. The term, however, is usually applied in England to the non-rhyming heroic, or decasyllabic line, first made use of by the Earl of Surrey in his translation of the *Æneid*, published in 1557, and immediately afterwards adopted by our early dramatists as the most suitable from its elasticity and its freedom from caesural fetters for dramatic purposes. Several of the early poets and dramatists—notably Shakespeare, Massinger, and Fletcher—frequently add an additional syllable, making the number eleven; but this, according to modern canons at least, must be reckoned a liberty. Milton, by his *Paradise Lost*, has

constituted B. V. the measure for English epic, and though in the Queen Anne era the rhyming decasyllabic verse came into vogue, and was demonstrated by Pope to be admirably adapted for didactic verse and for the poetical essay, yet the adaptability of B. V. for narrative and dramatic purposes has never been impugned. For a fine analysis of the B. V. of our greatest dramatists, see Scott's 'Letter' to Lockhart on the authorship of the *Two Noble Kinsmen*.

Blan'qui, Jerome Adolphe, an eminent French economist, was born at Nice, 21st November 1798. Coming to Paris, he made the friendship of J. B. Say, who procured for him some public teaching on subjects connected with political economy, notably at the Athénée in 1825, where he delivered a course of lectures on *L'Histoire de la Civilisation industrielle des Nations Européennes*. In 1830 he became director of the *École spéciale du Commerce*, and in 1833 succeeded Say at the *Conservatoire des Arts et Métiers* as Professor of Industrial Economy. From 1846 to 1848 he was a useful deputy, doing much commission work. His special reports on Corsica (1838), Algiers (1840), and the London Exhibition of 1851, furnished to the Academy of Moral and Political Science, are valuable. Besides a journal of travel in England and Scotland in 1824, B. wrote two important works in political economy, in which he supported free trade, and adopted a position between the 'Utopias of Socialism' and the rigour of Malthus. These are his *Précis Élémentaire d'Économie Politique* (Par. 1827), with a biography of economists; and his *Histoire de l'Économie Politique en Europe* (4th ed. Par. 1860), with a biography of the science. B. says in the latter work, 'It is not sufficient for political economy that wealth has been produced, she must see it equitably distributed.' Hence he carefully analyses the historical phenomena of slavery and pauperism. B. died at Paris, 28th January 1854.—**Louis Auguste B.**, brother of the preceding, was born at Nice in 1805, and at an early period involved himself in secret associations for the overthrow of the existing forms of society. Captured in the armed outbreak of 12th May 1839, he was condemned to perpetual imprisonment, but was released at the revolution of February 1848, and instantly set to work to reorganise—that is to say, to disorganise—society. He founded the Central Union Republican Club, had a chief hand in the inflammatory 'manifestoes' of the 17th March, 16th April, and 15th May, and was in consequence again imprisoned for ten years at Belleisle (q. v.). In 1861, on account of fresh plots, he was once more sentenced to an additional four years' imprisonment. After the overthrow of the Napoleonic dynasty in September 1870, the grey-haired 'Irreconcilable,' most of whose life had been spent in chains, reappeared in Paris, as eager as ever for a social republic. In 1872 he was again sentenced to perpetual imprisonment.

Blaps, a genus of *Coloptera* or beetles, represented by such species as the *B. mortisaga* or churchyard beetle, by the *B. sulcata*, &c. These forms belong to the *Heteromorous* group of the order, the members of which possess four joints in the tarsi of the hinder pair of feet, and five joints in the tarsi of the other legs. No distinct neck exists in this genus. The colour is black, the elytra or wing-cases, representing the first pair of wings, being joined together. These beetles are nocturnal in habits, and of slow movements. They feed on decaying vegetable matter, and some species possess the power of secreting a brownish liquid of irritating odour and properties. *B. sulcata* is said to be eaten in Egypt, under the idea that it gives to the female figure a fatness and redundancy.

Blas'ius, St., the martyr, was Bishop of Sebaste in Cappadocia, when Licinius, the rival of Constantine the Great, began a persecution of the Christians. He thereupon left the town; and hid himself among the rocks; but was discovered, and brought back to Sebaste, where he suffered a cruel martyrdom in A.D. 316. Because a wool-comb was one of the instruments by which St B. was tortured, the woolcombers claim him as their patron; and at Bradford, in Yorkshire, a procession is held on St B.'s day, the 3d of February, every seven years. In the Greek calendar, however, St B.'s festival is celebrated on the 11th of that month. He is invoked for sore throats, because he is said to have saved the only son of a widow from being choked by a fish-bone.

Blas'phemy. It has been held in England that this crime is not committed by an attack, however violent, on any religion

except the Christian religion, nor on any form of the Christian religion except that established by law. If, however, there be an attack on a dogma or principle of any form of Christianity, which that form holds in common with the established religion, then the crime of B. is committed. The reason being simply that the form established is established by law, and so entitled to its protection. It may, however, be questioned whether any expression of theological opinion, if in temperate language, however heterodox, would now be considered criminal. The decision above referred to—that of Baron Alderson, in the case of *Gathercole*, tried at York in 1838—so far rests on a sound legal principle, that that which the law establishes, the law must protect from contempt; but it is not contempt to discuss with perfect freedom, if in temperate language, the merit or truth of any principle or institution which the law has established. To lay down that there are certain subjects which no one shall publicly discuss, except with a foregone conclusion, may be held as a violation of the principle of personal liberty. On the other hand, it is perfectly right that that which the great majority of a people of a country hold sacred should be protected from ridicule or from being made the subject of virulent or contemptuous attack; just as any one is entitled freely to discuss the wisdom of a law, while no one is allowed by word or act to treat that law with contempt. In Scotland, in 1843, in trial for B., in which the prisoner was found guilty, it was laid down by Lord Justice-Clerk Hope, that those who publish opinions 'contrary to the known principles of Christianity' may be lawfully proceeded against for so doing before the civil magistrate. In the case in question, however, the publication by which the offence was constituted seems to have been violent and virulent in its tone; and probably no temperate discussion, whether written or spoken, however untrammelled, would now be regarded by a civil court as injurious to 'the known principles of Christianity.'

Blast, Hot. In 1828, Mr James Beaumont Neilson, then manager of the Glasgow Gasworks, discovered that great benefit would arise from heating the air used to support the combustion in Blast Furnaces (q. v.), and he took out a patent for his discovery. The ironmasters ridiculed it at first, then adopted it everywhere, and then in some cases made a discreditable attempt to evade payment of any royalty to the inventor. The action against Messrs Baird of Gartsherrie, in 1843, has become almost historical. That firm admitted to have made a profit of £260,000 in ten years on H.-B. iron, but refused to pay his royalties to the man through whose invention they had been able to make this money. After a ten days' trial, in which the defendants' conduct was severely censured by the judge, the validity of Mr Neilson's patent was fully established. As an instance of the value of the H. B., it may be noted that by its use the Clyde Ironworks, which in 1829 were using 8 tons 1 cwt. of coal made in coke for the manufacture of 1 ton of iron, were enabled in 1831 to double their turn-out, and use only 2 tons 5 cwt. of coal in its raw state per ton of iron. The temperature of the blast is from 500° to 800° Fahr., or even more, and its pressure about 3 or 4 lbs. per sq. in.

Blast Furnace, a furnace to which the air for supporting combustion is introduced under pressure—generally used for the reduction of metallic ores. The most important blast furnaces in this country are those used for the reduction of iron from its ores and the manufacture of 'pig-iron.' These are generally in external appearance immense cylinders of brickwork, 50 to 100 ft. high, bound with iron. Internally the smallest and lowest part is a cylindrical chamber called the *hearth*, and above this the furnace expands rapidly in the *boshes*, where its shape is that of an inverted cone. The part of the furnace above the boshes is called the shaft, and is commonly cylindrical, or tapering slightly inwards towards the top. In some modern furnaces the alteration of shape which distinguishes the parts just named is almost obliterated, the one running fairly into the other. The top or mouth of the furnace should be closed with a cast-iron *bell*, so as to prevent the free escape of the gases of combustion. The furnace is fed with fuel and ore at the top (the bell being lowered at intervals for that purpose), and the Blast (q. v.), which is supplied by a blowing-engine, is injected through a number of *nozzles*, called *twyers* (*hyfers*), in the sides of the hearth. The reduction of the ore takes place as it makes its way down the shaft and boshes, and the liquid iron accumulates in the hearth. A tap-hole in the latter is opened as often as may be

necessary (say once in twelve hours), and the metal allowed to run out and fill a number of channels prepared for it in the sand of the *pig-bed*. When anything like economical working is desired, the gaseous products of combustion are carried off into flues through openings near the top of the B. F. below the bell, and are used to heat the blast on its way from the blowing-engines to the furnace. The iron produced by the B. F. is crude pig-iron, often containing sulphur, phosphorus, and other detrimental impurities.

Blasting, the operation of breaking up stone or rock *in situ* by the use of an explosive agent. It may be divided into three stages—boring the holes, loading, and firing. The holes in small-shot B. are commonly from 1½ to 3 inches in diameter, and from 3 to 12 feet deep, according to circumstances. Hand-boring is done with a steel-pointed tool called a 'jumper,' either by striking it with hammers, or by weighting it, and allowing it to fall from a little height. When the hole has been bored to a sufficient depth, the fragments of rock not previously taken out are removed, and the powder is introduced. A fuse (commonly Bickford's) is then placed in the hole, one end in contact with the charge, the other projecting at the mouth of the opening, wadding of turf or hay is pushed down upon the charge, and the hole *tamped*—that is, filled up with fragments of stone or brick or clay, rammed down so as to present as great resistance to the charge as possible. The charge is fired by igniting the free end of the fuse.

For carrying on large B.-work, 'mines,' or shafts of considerable diameter, take the place of the holes above described. The shafts are large enough for men to work in, and have in some cases been made as much as 80 feet long. The charge has sometimes been as much as 3000 to 4000 lbs. of B.-powder. The mines are exploded by electricity instead of fuses. As much as 10,000 or 12,000 tons of stone were several times thrown down by the explosion of a single mine during the quarrying operations for the stone of the Holyhead Breakwater. For many years gunpowder was the only explosive agent used in B. operations, but lately various other explosives—as Dynamite (q. v.), Gun-cotton (q. v.), lithofractor, &c., have been also employed to some extent. See also BORING and TUNNEL.

Blastoidea, an order of extinct *Echinodermata*, the fossil remains of which are exclusively confined to rocks of the oldest or palæozoic period of geology. They are most commonly found in the Carboniferous rocks, and the typical genus is *Pentremites*. *P. pyriformis* and *P. conoideus* are familiar species. The body was fixed to the sea-bed by a short, slender, and jointed stalk or column, and was of oval or globular shape. It was composed of limy plates, united together, and arranged in five *ambulacral* and five *inter-ambulacral areas*. No distinct arms, as seen in the *Crinoids*, appear to have been developed in the *Blastoidea*.

Blatt'a. See COCKROACH.

Blaye, a fortified town of France, in the department of Gironde, on the right bank of the estuary of the Gironde, with an export trade in corn, wine, brandy, fruits, soap, and oil, and some manufactories of linens, woollens, glass, and earthenware. In addition to its fortifications, it is overlooked by a castle on a rocky eminence, and its approaches are defended by three forts. Pop. (1872) 4478, including the garrison. B. is the *Blavia* of the Romans. In the 4th c. it was won over to Christianity by the preaching of St Romanus, in whose church are said to repose the ashes of the first Merovingian Duke, Charibert, brother of Dagobert, and of Roland, the nephew of Charlemagne. Its mediæval history was much chequered, but not significant.

Bla'zon, Bla'zoning, Bla'zonry, is the art of describing armorial charges in correct heraldic language, and of representing them accurately in form, position, arrangement, and colouring. The German word *blasen*, 'to blow a blast on a horn,' is the origin of these terms; and its meaning refers to the fact, that when a knight entered the lists at a tournament, his presence was announced by sound of horn, after which the official heralds declared his armorial insignia.

Bleach'ing, the art of rendering animal and vegetable products white in colour by atmospheric agencies or the employment of chemical substances; an important operation in the process of manufacturing textile fabrics used in clothing, which

branch of the subject will only be treated of in this article, leaving the B. of paper, straw, wax, &c., to be dealt with under their respective heads. Cotton, flax, wool, and silk all possess a certain amount of colouring matter, and in the operations of spinning and weaving these fibres gather certain impurities. B. is resorted to to cleanse and whiten the woven fabrics, as well as to prepare them for the reception of dyes and ornamental designs. One hundred years ago cotton and linen were bleached by exposing the fabrics to the combined action of light, air, and moisture; this method, however, was a very tedious one, and the fortunate discovery of the effective and rapid B. properties of chlorine speedily effected a revolution in the art of B. In the middle of last century the Dutch were esteemed the best bleachers in Europe, and it was the usual practice to send linen of Scotch manufacture to be bleached in Holland. Soon thereafter, through the instrumentality of the Board of Manufactures, bleachfields were established in Scotland. The operations were based on the Dutch method, and consisted of steeping the cloth in alkaline leys and washing with soap, called 'bucking'; then immersing the cloth in butter-milk, called 'souring'; and afterwards exposing it to the action of sunlight and frequent waterings, called 'crofting.' These several operations were repeated till the desired purity was obtained, many months being thus occupied. Dr Home of Edinburgh effected the first improvement by employing, in the 'souring' process, water acidulated with sulphuric acid, with considerable saving of time. In 1785 Berthollet, a French chemist, demonstrated that *Chlorine* (q. v.) was eminently suited for B., and this led to its adoption in the form of an aqueous solution, a change which shortened the process of B. cottons to almost as many days as months were formerly occupied. One objection to the employment of the chlorine solution lay in the difficulty of regulating its proper strength, for when too strong the fibres of the cloth were permanently injured. In 1799, however, this objection was removed by the discovery, by Mr Tennant of Glasgow, that dry slaked lime was an excellent absorbent of chlorine gas; and since that time the compound so produced, properly called *Chloride of lime* or *B.-powder* (q. v.), has been in universal use for B. vegetable fibres. Animal fibres, as wool and silk, are bleached with sulphurous acid. Subsequent improvements consisted in the introduction of machinery where practicable for facilitating operations. B. is now carried on as a rapid and continuous process, a great number of pieces of calico being sewed end to end, and carried by machinery from one stage to the next. A preliminary process is *singeing*, by passing the grey cloth over red-hot plates or through a gas flame, to remove the downy nap from the surface. The general sequence of operations then are—1st, *liming*, passing the cloth through a super-saturated solution of lime; 2d, boiling, or *bowking*, in large close kiers for several hours. The boiling with lime forms a calcareous soap with the grease in the cloth, which is, 3d, *washed* out to remove the weaver's dressing, &c. The cloth is, 4th, *soured* with hydrochloric acid solution, which removes the remaining lime and calcareous soap, after which it is, 5th, again *washed*. It is next, 6th, again *boiled* in kiers with rosin and soda-lye; and, 7th, again *washed*. The calico is now ready for the, 8th, *chemic* or B. liquor, a weak solution of chloride of lime, 9th, *soured* with very dilute sulphuric acid, and, 10th, thoroughly *washed*, after which it is ready for *drying*. If intended for printing, this finishes the processes through which the cloth passes; if for white bleach only, the cloth passes through several important finishing operations (see *CALENDERING*). The B. action of chlorine depends upon its power of decomposing water, combining with the hydrogen and liberating oxygen.

When the oxygen is liberated it is *nascent*, or in the state of single atoms, and immediately attacks the vegetable colouring matter to form compounds destitute of colour. Free oxygen does not possess this property to any great extent, because it consists of a molecule or a group of atoms with less active properties than the element in the nascent state. On the other hand, the element in a condensed form, called *Ozone* (q. v.) (three volumes of oxygen forming two volumes of ozone), is more active than free oxygen, and as ozone is always present in the atmosphere, it is probable that the B. action which follows the exposure of cloth to the air is due to its activity.

Linen contains more colouring matter than cotton, and whereas cotton only loses about $\frac{1}{2}$ of its weight in B., linen loses about $\frac{1}{3}$. Linen is occasionally subjected to the operation just

described, but with more dilute solutions and repetitions of the processes, as the colouring impurities have a firmer hold of the fibres. For some varieties of linen, the operation of 'crofting' is combined with the chlorinating process. Animal fibres are more liable to injury from chlorine than vegetable fibres, therefore in B. wool and silk the *sulphuring* process is pursued. Wool contains a large amount of natural grease, and it is increased by the weaver's dressing, and to remove this the wool is scoured with water and stale urine; carbonate of ammonia is evolved, which combines with the grease, and the soapy compound formed is removed by washing with water. Washing-soda and soap are sometimes substituted for the urine, but the result is not so satisfactory. The damp woollen cloth is then submitted in a close chamber to the action of burning sulphur; the dioxide produced in the combustion readily combines with the moisture to form sulphurous acid, which discharges from the wool the colouring matter by forming with it a colourless compound. Fabrics composed of cotton and wool are bleached by passing them through a warm solution of soap and soda, and then sulphuring for several hours. Silk, except in special circumstances, is not bleached with sulphur. The prevalent pale tint is acquired by boiling the silk in a strong solution of soap, thereafter immersing it in a solution of washing-soda, and then for a short time in a very dilute acid, washing and rinsing in water between each operation. If perfect whiteness is desired, the silk stuff is bleached by sulphurous acid like wool.

Bleaching-Powder, or *Chloride of Lime*, is an important substance manufactured in large quantities in this country and abroad as a disinfecting and bleaching agent. It is prepared by slowly passing chlorine over slaked lime spread in layers 2 to 3 inches in thickness on perforated leaden shelves or flag-stones, till the gas ceases to be absorbed. B.-P. consists essentially of a compound of lime and chlorine, generally represented by the formula CaOCl_2 . It was formerly regarded by chemists as a mixture of hypochlorite and chloride of calcium, CaCl_2O , CaCl_2 . Its use as a bleaching and disinfecting agent depends upon the ease with which it is decomposed by acid into free chlorine and a salt of lime. The carbonic acid of the air is sufficient to produce this change.

Bleak, a *Teleostean* fish, belonging to the *Cyprinidae* or Carp family, and scientifically known as the *Leuciscus alburnus*. The B. inhabits fresh water, and averages about 6 inches in length. It somewhat resembles the nearly-allied dace (*L. vulgaris*). A single dorsal fin placed far back on the body exists. The beak is pointed, and the lower jaw protrudes. The scales exhibit a striated or striped appearance, and are used for making artificial pearls and other ornaments. The back is coloured greenish, the fins and rest of the body being silvery white. The tail is deeply cleft or forked. The B. inhabits most of our English streams and rivers. It is active in its movements, its food consisting of flies and insects, which it pursues at the surface of the water. Its flesh is very palatable, its small size rendering its use as a common article of diet rather less frequent. These fishes are caught by means of gentle bait and also with flies. They are fond of bran, and may be allured to the surface by strewing this substance on the water.

Bleeding. See *HÆMORRHAGE* and *BLOOD-LETTING*.

Bleek, Friedrich, one of the most learned of modern German theologians, was born at Arensbök, in Holstein, 4th July 1793, studied first at Kiel and afterwards at Berlin under De Wette, Schleiermacher, and Neander. After holding several minor appointments, he was appointed Professor of Theology at Bonn in 1829, where he laboured till his death, 27th February 1859. B., whose writings embrace the whole field of biblical exegesis, is notable alike for his clear and acute criticism, his exegetical skill, and his warm enthusiasm for Christianity. His masterpiece is *Der Brief an die Hebräer* (Berl. 1828-40). In his *Beiträge zur Evangelienkritik* (Berl. 1846) he sought, among other things, to vindicate the genuineness of the Gospel of St John against the destructive criticism of the Tübingen school. After B.'s death appeared his *Einleitung in das Alte Testament* (Berl. 1860), and *Einleitung in das Neue Testament* (Berl. 1862), both of which display in a high degree his fine intellectual scholarship, reverence, and love of truth. The same qualities are visible in his *Synoptische Erklärung der drei ersten Evangelien* (Leips. 1862), and *Vorlesungen über die Apokalypse* (Berl. 1862).

Black, Wilhelm Heinrich Immanuel, son of the foregoing, an able linguist, was born 8th March 1827, studied at Bonn and Berlin, and at an early period chose for his specialty the S. African languages. His thesis, when he took his degree, was *De Hominum Generibus Linguarum Africa Australis* (Bonn, 1851), in which he sought to prove the N. African origin of the Hottentot tongue. In 1855 he went out to Natal along with the newly-appointed Bishop Colenso, and in the course of extensive journeys into the interior and the neighbouring Caffre lands, made himself acquainted with the languages, manners, and customs of the natives. In 1856 he obtained an appointment at Cape Town, which gave him an opportunity of prosecuting further his linguistic studies, especially in reference to the languages of S. Africa, Australia, and Polynesia. B. is the chief author of the *Handbook of African, Australian, and Polynesian Philology* (Cape Town and Lond. 1858-63), a work which not only embraces all the literature extant in these tongues, but attempts also a classification and characterisation. Of his other productions, besides a *Vocabulary of the Mozambique Languages* (Lond. 1856), may be mentioned his *Comparative Grammar of South African Languages* (Cape Town, 1862); *Reynard the Fox in S. Africa, or Hottentot Fables and Tales* (Lond. 1864, Ger. ed. 1870); *Über den Ursprung der Sprache* (1868), &c. He died 17th August 1875.

Bleiberg ('lead hill'), a town of Austria, province of Carinthia, situated at an elevation of 3000 feet, on a range of hills 8 miles W. of Villach. The hills are rich in metallic wealth, and are literally honeycombed by lead and zinc mines, the number of which amounts to nearly 500, though only 50 are in full operation. There are also 22 smelting furnaces. Pop. (1869) 4061.

Blende (ZnS), the sulphide of zinc, a valuable ore of that metal. When pure, it has a yellow or pale-brown colour, and contains in every 100 parts 67 of zinc and 33 of sulphur, but as found native it is usually of a brown or black shade from the admixture of sulphides of iron and cadmium and other impurities: iron imparts the latter hue, whence the name 'black-jack,' given to B. by English miners. B. occurs, usually associated with Galena (q. v.), in Derbyshire, Cumberland, and Cornwall, in England, and in numerous localities throughout the globe. The term B. is also sometimes applied to the sulphides of other metals, as antimony B., manganese B., &c.

Blén'ean, a village of France, department of the Yonne, 30 miles W.S.W. of Auxerre, is the scene of Turenne's victory over the Prince de Condé in 1652. Pop. (1872) 1433.

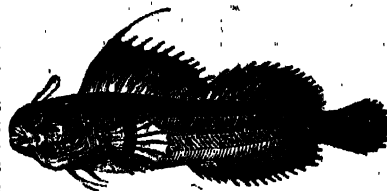
Blén'heim (Ger. *Blindheim*), a village of Bavaria, 23 miles N.N.W. of Augsburg, near the scene of Marlborough's 'famous victory' of 13th August 1704. Assisted by Prince Eugene and the Imperialists, Marlborough, with 52,000 men, attacked the French and Bavarian army of 56,000 men under Tallard, Marsin, and the Elector of Bavaria, and gained a decisive victory. The loss of the French and Bavarians in killed, wounded, and prisoners (among these last was Tallard himself) was estimated at fully 30,000. The allies lost about 5000 in killed and had 8000 wounded. Bavaria came into the possession of the victors. The battle is known to the Germans as that of Hochstädt, the name of the village where the conflict actually occurred. The Austrians were defeated by the French near B. in 1800.

Blén'heim Dog, a spaniel allied to the Cocker (q. v.), and so named from its having been originally bred by one of the Dukes of Marlborough. The colour is usually black, with light-brown or yellowish spots on the feet and breast and above the eyes. The muzzle is broader than in the cockers. The ears are also, if anything, longer, and more drooping, than in the latter dogs.

Blennorrhoe'a, or **Blennorrhæ'gia**, from two Greek words signifying a flow of Mucus (q. v.), and if applied literally would signify an unusual flow of mucus from any Mucous Membrane (q. v.). When used in medicine, however, it is almost always restricted to a specific disease of the urethra, termed *Gonorrhoea* (q. v.), or gleet. B. is almost always the result of inflammation of the mucous membrane with which it is connected, and the treatment consists in subduing that inflammation by soothing measures, by local astringents, and attending to the general health.

Blenn'y (*Blennius*), a genus of Teleostean fishes belonging to the section *Acanthopterygii*, and family *Gobiidae* or *Blenniidae*.

The fishes of this family have large, blunt heads, with an abrupt profile, and usually possess fringed appendages also. A single but divided dorsal fin exists. The ventral fins are placed on the front of the throat, and consist of two



Blenny.

rays ununited by any membrane. No air-bladder exists. The skin is furnished with small, concealed scales, and gives off a mucous secretion like that of the eels, whence the name B. (Gr. *blennos*, mucus) is derived. The pectoral fins are of large size, and the anal fin is long. The Shanny (*Blennius pholis*) is the common British species, and, like others of these fishes, hides in the nooks and crannies of rocks as the tide recedes. Another species is the ocellated B. (*B. ocellaris*), which possesses curiously branched filaments borne in the head. One species, termed the 'eel pout,' and included in a different genus (*Zoarces viviparus*), is noted as bringing forth its young alive—a function said to be exhibited by other blennies. Other species are the *Blennius Yarellii*, *B. gattorugine*, &c. They are active fishes, and can live for a considerable period out of water.

Bléré, a town of France, department Indre-et-Loire, on the Cher, 15 miles E.S.E. of Tours. Pop. (1872) 1992. Close by is the castle of Chenonceaux, purchased by Henri II. of France for Diana of Poitiers, and afterwards the residence of Catherine de Medici. It also possesses an abbey of the 12th c., and the ruins of an aqueduct.

Blessed Thistle. See THISTLE.

Blessington, Margaret, Countess of, a celebrated leader of society, was the daughter of an Irish gentleman named Edmund Power, and born at Knockwill, near Clonmel, Tipperary, September 1, 1789. She was first married to Captain Farmer, who died in 1817, and in the year following to Charles John G. Her, Earl of B. She had literary tastes, travelled much, and, both in London and on the Continent, during her husband's life and after his death (1829), gave soirées which were much frequented by authors. A most prolific writer of novels, travels, sketches, memoirs, &c., her only important book is her *Conversations with Lord Byron* (1834), with whom she formed a friendship. Along with Count D'Orsay, she followed the late Louis Napoleon to Paris, where she died, June 4, 1849. See Madden's *Literary Life and Correspondence of the Countess of B.* (Lond. 1855).

Bletch'ingly, an agricultural town in Surrey, 20 miles S. of London. It has a large and handsome parish church, St Mary's, with a low square tower and a chime of eight bells. Pop. (1871) 1916. Old Roman coins are found in its vicinity, and the fossil remains of the iguanodon, an extinct reptile, were discovered in cutting the B. railway tunnel.

Blett'ing, from the Fr. *blesse*, a term applied by Lindley to that intermediate stage between the maturity and decay of a fruit. It is the first change after the sugar in the ripe fruit has commenced to oxidise. Accordingly, if fruits like pears and apples be kept in close vessels free of oxygen, they will preserve for a much longer period than they would otherwise do.

Blich'er, Sten Stensen, a Danish novelist and poet, born at Wiwm, in Jutland, 11th October 1782; studied theology at Copenhagen; in 1819 obtained a living at Thorning, which he exchanged in 1825 for one more valuable at Spentrup, Jutland, where he died, 26th March 1848. Belonging to no poetical or philosophical school, he was long known only as the translator of *Ossian* (2 vols. 1807-9); although two volumes of poems which appeared in 1814 and 1817 proved him to possess unquestionable genius. The first thing that attracted much notice was his *Sneeklokken* (1826), and still more his contributions to the monthly journal the *Nordlyset* (12 vols. 1827-29). Here appeared his *Lydske Romanzer*, a happy attempt to turn the Jutish dialect of Danish to poetical uses. A collected edition of

his novels, in 5 vols., was published at Copenhagen in 1833-36, and of his poems in 8 vols. 1835-36. B. has humorously sketched his own life in his *Gamle og nye Noveller* (7 vols. Copenh. 1846-47; 3d ed. 8 vols. 1861-62). His novels contain exquisitely truthful pictures of country life in Jutland, with which his pursuit of the chase over its barren solitudes had familiarised him, and his poetry is equally national and spirited.

Blidjah, a town of Algeria, 30 miles S.W. of Algiers, and 220 E.N.E. of Oran, with both of which it is connected by rail. It lies to the S. of the fertile plain of Metidjah, and has a growing trade in esparto-grass, wine, cotton, wheat, and barley. Pop. (1872) 8113.

Bligh, William, was born at Plymouth in 1753, and after serving as a lieutenant under Captain Cook, was in 1787 sent out in the *Bounty* to Tahiti to ship a cargo of bread-fruit trees for the W. Indies. He left Tahiti in 1789, and was proceeding to Jamaica, when Fletcher Christian and twenty-four other members of the crew mutinied, turned B. and the remaining eighteen seamen adrift in the launch with a few days' provisions, and returned to Tahiti. This was near Topea, 19° S. lat. 184° E. long. B. managed to reach the island of Timor, 3600 miles distant, in about six weeks, but only twelve of the faithful crew reached England with him in 1790. He was appointed a commander, and soon afterwards succeeded in taking the bread-fruit from the South Seas to the W. Indies. In 1792 he published an account of his voyage. In 1806 he became Governor of New S. Wales, but in 1808 resigned this post, on account of his extreme unpopularity. B. died in London, 7th September 1817. See Lady Belcher's *Mutineers of the Bounty* (Lond. 1870).

Blighia. See **AKEE**.

Bligh Islands, Polynesia, in long. 180°, and S. lat. 15° 30'-19° 30', a group discovered by Tasman in 1643, and named after Captain Bligh, who sighted them from the open boat in which he made his perilous voyage after his expulsion from the *Bounty* by his mutinous crew.

Blight, a term vaguely applied to a diseased condition of various grains and other grasses, no matter how caused, but is, properly speaking, limited to those diseases caused by minute parasitic fungi, known as Smut-Balls, Bunt, Pepper Brand, or Stinking Rust (q. v.). B. is often owing to errors in manuring, the fungi attacking unhealthy plants so caused. A false B., which does little harm to the plant, is caused by an abnormal development of the epidermal cells (the *Derma*, q. v.), which bursts the cuticle and forms mealy patches on the surface of the plant, simulating by their colour and appearance an attack of true B.

Blimbing, the acid fruits of *Averrhoa Bilimbi* and *A. Caranbola*, two plants belonging to the natural order *Balsaminaceæ* (q. v.). They are eaten by the natives of India, and are used as pickles by the Europeans.

Blind, The, is the name applied to those who lack the sense of sight. This class, which is greatly on the increase in England and various other countries, has received inestimable benefits at the hand of modern philanthropy. Charitable institutions for the maintenance of the B. existed, indeed, as early as the 12th c., but provision for their education and self-improvement has only been made within comparatively late years. To the present century belongs not only the foundation of almost all the asylums now existing, but also the vast extension of the field of B. industry, and above all, the invention of relief-printing, and the consequent creation of a B. literature.

In 1871 the number of the B. in the British Isles was 30,956, or 1 in every 1022; and this proportion almost exactly corresponds to that of the various flat areas of Europe, as France, Prussia, Belgium, and the plains of Hungary, Denmark, and Lombardy. Mountainous countries have a much lower average, with the singular exception of Norway, which has 1 blind person in every 482 inhabitants. It has been estimated that the B. in the world are not fewer than 3,000,000; and of this vast number, some 30,000 belong to France, 35,000 to Germany, upwards of 70,000 to Russia, some 1600 to Holland, 3300 to Sweden, and upwards of 2000 to Norway. The large number of the B. in all highly civilised countries would seem to indicate that intellectual pursuits and industrial modes of life are among the more

important causes of blindness. (See **BLINDNESS**.) The B. in Britain, arranged in the order of age, are as follows, according to the census of April 3, 1871:—

	England.	Scotland.	Ireland.	Total.
Under 5 years of age	567	49	32	646
From 5 to 10 . . .	700	103	67	870
" 10 " 15 . . .	871	135	116	1122
" 15 " 20 . . .	881	143	140	1164
" 20 " 30 . . .	1728	248	637	2613
" 30 " 40 . . .	2048	281	701	3030
" 40 " 50 . . .	2314	325	717	3356
" 50 " 60 . . .	2878	380	947	4205
" 60 " 70 . . .	3491	471	1243	5205
" 70 " 80 . . .	3883	533	1020	5436
" 80 " 90 . . .	2985	300	588	3873
" 90 " 100 . . .	248	51	126	425
" 100 and upward .	2	7	5	14
	21,590	3019	6347	30,956

The small proportion of juveniles in this table, and more especially in the column relating to Ireland, is worthy of note, while the fact that 13,962, or 45 per cent. of the whole, are above sixty years of age shows clearly that old age and infirmity contribute largely to blindness. It is also seen from the census that the B. are more numerous in agricultural than in manufacturing and mining counties, a circumstance partly to be ascribed to the great average age attained in the former, and partly to the constant exposure of an agricultural life. In Scotland and Ireland the females steadily predominate, while in England the males are as fixedly in excess, as will be seen from the following table, giving the census of the three decades 1851-71:—

		Males.	Females.	Total.
England . . .	1851	9,807	8,670	18,477
	1861	10,340	9,199	19,549
	1871	11,378	10,212	21,590
Scotland . . .	1851	1,466	1,544	3,010
	1861	1,399	1,421	2,820
	1871	1,490	1,529	3,019
Ireland . . .	1851	3,588	3,999	7,587
	1861	3,149	3,730	6,879
	1871	3,022	3,325	6,347

The gradual decrease in the total number of the B. in Ireland, observable in the above table, is in a great measure due to a falling off in the population at large. In England, again, the number has steadily increased, and in Scotland it is almost exactly the same as it was twenty years ago.

As early as 1178 an asylum for the B. was established by Weef VI. at Memmingen. In 1260 the *Hospice des Quinze Vingt* was opened in Paris by St Louis, for the reception of 300 persons (as its name implies), and was originally intended for those Crusaders who had lost their sight on the burning plains of Egypt and Syria. Here pensions were granted of a franc and a half a day to those who chose to reside in the house, while smaller pensions were granted to any who preferred to reside with friends. In 1784 the cause of the B. seems to have attracted special notice, and in Paris the first institution for their education was opened by the famous M. Valentine Haüy, under the patronage of the Philanthropic Society. This establishment was closed during the Revolution, but was re-opened in 1817, and since 1843 has occupied a building capable of receiving 160 pupils, who receive, in addition to a primary education, careful instruction in music, for which many discover a special aptitude. Institutions of a similar kind were soon afterwards founded in Amsterdam, Berlin, Breslau, Brussels, Copenhagen, Dresden, Edinburgh, Liverpool, London, Vienna, Zürich, and in many towns of the United States. In 1791 the Liverpool school for the B. (Hardman Street) was opened; but it was left to the Rev. Dr Johnston, of North Leith, assisted by Dr Blacklock, the poet, and William Witherforce, to open, in 1793, at Edinburgh, the first institution for the employment and industrial training of B. adults. In the same year the school at Bristol was begun; then followed, in 1799, St George's-in-the-Fields, London; in 1805, Norwich school; in 1810 (Sackville Street), Dublin; in 1812, Aberdeen (Industrial); in 1815 (Moly-

neux), Dublin; in 1827 (Henshaw's), Manchester; in 1828, Glasgow (Industrial); in 1831, Belfast; in 1833, York; in 1835 (Gayfield Square School), Edinburgh; and 'The Society for Teaching the B. to Read,' in London, in 1838. In 1873 there were 148 institutions for the B. in the world. A splendid new building for the B. in Edinburgh was completed in 1876.

The industrial employment of the B. is necessarily restricted to departments of work which do not require very delicate manipulation; but instances are on record of B. people who have maintained themselves as clock and watch cleaners, sculptors, surveyors, &c. Large numbers of the male B. are employed as basket-makers, rope and twine spinners, brush and mattress makers; others are employed as mat and matting makers, choppers of firewood, and sack-weavers; while a few are engaged as shoemakers and wood-turners. Piano-tuning has recently been added to the employments of the B., and from their quickness of ear it is very likely to prove a valuable addition to their limited resources. The female B. are usually taught to knit, net, and make fancy-work of various sorts, which seldom pays. In Scotland, and especially in the Royal B. Asylum, Edinburgh, sewing has been long a remunerative source of employment. Sewing sacks and bags for grain, &c., also pays well. Brush-making by the females is now carried on to a great extent, while the seating of cane chairs, making of carpet brooms, &c., gives employment to a number more. The use of the sewing-machine was a few years ago introduced into some of the London institutions, but the amount of supervision required is so great that it is very questionable if it ever can be employed extensively.

M. Haüy, as the inventor of printing in relief, is to be regarded as the founder of the literature for the B., although there had been several previous attempts to give to this class a knowledge of letters. The invention of M. Haüy, which has never been superseded, was taken up subsequently by Mr James Gall, of Edinburgh, among whose modifications may be mentioned the reduction of the number of letters of the alphabet, the employment of a larger type, and the substitution for curves and circles of angles and straight lines. In 1827 Mr Gall issued his *First Book*, printed in the new manner, and such was its success, that it was quickly followed by his *Scripture Statements* and an *Epitome of Old Testament History*. Two years later, having procured a sufficient number of subscribers, at the rate of one guinea a copy, he began to print the first book of the Bible ever brought thus within the reach of the B., namely, the Gospel by St John—a work which did not, however, appear till 1834, owing to many serious causes of delay. These works showed an advance upon the French printing, and could be read by the B. with greater ease, but they were so costly as to be practically beyond the reach of the class for which they had been mainly produced. Still the success of Mr Gall had roused the interest of the public, and for the time being Edinburgh was the enthusiastic centre of this new branch of philanthropy. In 1832 the Edinburgh Society of Arts offered their gold medal (value twenty sovereigns) for the best B. alphabet and method of printing. Mr Gall's establishment was visited by the Abbé Carton, in the name of the Belgian Government, and later by Dr Howe of America, and these visits led to the foundation of similar institutions in Boston and Brussels. In America, a private press had been set up in Philadelphia by Mr Jacob Snider, who issued the Gospel by St Mark, in 'the capital alphabet,' in 1834. When the general attention had thus been once fairly stirred, there began to appear the utmost variety of schemes and theories for the perfection of this method of printing, and many were the attempts made ostensibly to improve and simplify the alphabet. The only inventions of any great value in the way of printing were—(1) the serrated type, which produces a series of dots instead of straight lines; and (2) the 'return line,' or the alternate printing of lines running from left to right and from right to left. As regards the alphabet, it seems long to have remained a pet subject for the apprentice hand of the inventor. Till about 1830 there had been nothing used but the ordinary Roman alphabet, more or less modified for the sake of distinctness; but subsequently there were issued numerous experimental works in characters taken from existing systems of stenography. Among the twenty-one alphabets submitted to the Committee of the Edinburgh Society of Arts, there was one of this latter kind, which has since come to be employed extensively. It was that, namely, of Mr M. T. Lucas, to the merits of which we shall again refer. The medal of the Society, on the same occasion, was awarded to Dr Fry of London, whose

alphabet was a Roman one; but this decision was only come to after nearly five years of deliberation, and when a report had been obtained from the Rev. W. Taylor, a gentleman of great practical experience in teaching. Mr Alston, of Glasgow, subsequently so improved Dr Fry's system as to render the letters sharper and more tangible; and in this higher form it soon found its way into most of the schools throughout the country, and acquired everywhere a lasting popularity.

The question of stenographic *versus* Roman alphabets was long warmly discussed by the adherents of the two systems, but this dispute seems likely to obtain a quiet settlement from the test of experience in favour of the latter. As long ago as 1833, Mr Taylor saw 'no sufficient reason for departing from the common Roman letter,' and spoke decidedly against the adoption of any merely arbitrary characters.

The testimony of the Edinburgh Society was given in favour of the Roman letter in an elaborate report of over 30 printed pages. In this report it was stated—(1) 'That although an arbitrary character might possess in itself superior advantages in simplicity and tangibility, yet there would be great, and in many cases insuperable, obstacles to the B. generally acquiring a knowledge of any character not familiar to those possessed of sight. . . . (2) that the same objection applies, though perhaps in a less degree, to Mr Gall's angular modification of the Roman alphabet. . . . (3) that from being almost universally known in Europe and America, . . . the common Roman capital alphabet, as represented by the late Dr Fry, seems not only the best adapted for teaching the B. to read, but also as a medium of correspondence; . . . it would sooner be brought into general use than any of the other characters, . . . and expense would be greatly diminished.' Of the alphabetical systems still in use, the principal are those employing (1) Alston's Roman capitals, (2) the American smaller capitals, and (3) the French alphabet. The chief arbitrary systems are those of Lucas, Frere, Moon, Carton, and Braille. The alphabet of Mr Lucas of Bristol consists of thirty-six characters, ten of which represent double letters, and in printing, not only are all letters omitted that are not necessary to the sound, but whole words are often represented by single letters, as *the* by *t*, *yet* by *y*, *me* by *m*, &c. This system was held to have the manifold advantages incident to great condensation, but was found ultimately to be even longer than Alston's. The New Testament of the former occupied 841 pages, whereas in the full-length Roman capitals of the latter it only took 623. The system of Mr J. H. Frere of London, again, was founded on Gurney's shorthand, as that of Lucas was on Byron's, and its special feature is its being purely phonetic, the characters being intended to represent the simple sounds in the language. Its alphabet is composed of thirty-two characters, the vowels being represented by simple dots, which in a variety of positions indicate the different vowels. The many rules and directions for learning this system do not to any considerable extent obviate its difficulty. The alphabet of Mr W. Moon of Brighton (himself blind) contains six of the Roman letters unaltered, twelve others with parts left out, so as to be more open to the touch, while the rest are new and comparatively simple. All the words are printed in full, but this makes the system cumbrous and expensive. The works issued in it, including a monthly magazine, have, however, been widely circulated throughout the country by agents, and the inventor states in the preface to *Light for the B.* (1875), that '5000 persons have learned to read, including several at the advanced age of eighty or ninety, as well as children of tender years.'

In 1834 M. Louis Braille introduced his *point* system (a modification of an invention by a M. C. Barbier) into the Institute at Paris. It is very easily felt, and can be printed in much less space than Moon's or Alston's. In France no other method is used, and over the whole Continent it is fast displacing all other systems.

A B C D E F G H
 ● ● ● ● ● ● ● ● ● ● ● ● ● ●
 ● ● ● ● ● ● ●

Its root form is simply six dots (thus ::), and from these sixty-two variations are made. Besides having become the medium of many publications, it has been made the basis of a thorough musical notation. With the aid of printing frames, the B. themselves can use it as a means of correspondence. In 1871

the Braille system was ingeniously adapted in New York by Mr William Wait, who, by laying the root on its side (thus : . . .), and by representing the letters of most frequent occurrence by the fewest possible points, achieved a great reduction in expense. The Boston system, however, is firmly established in America by Dr Howe's long and energetic labours, which are being ably seconded by Mr N. B. Kneasse of Philadelphia, who issues a monthly journal, among many other works.

The present price of a copy of the New Testament by Alston is £2, by Gall £1, 12s., by Frere £2, 10s., by Moon £4, 10s., by Lucas £2, while the Gospel of St John is issued by Mr Wait at 2s.

See T. Anderson, *Observations on the Employment, Education, and Habits of the B.*; Dr J. Kitto, *The Lost Senses*; Dr G. Wilson, *The Five Gateways of Knowledge*; V. Haüy, *L'Éducation des Aveugles*; P. A. Dufau, *Des Aveugles, leur État Physique, Moral et Intellectuel*, crowned by the Academy.

Blind'age, screens made of timber and earth, or of trees slanting towards each other, which are sometimes placed in an inclined position against the walls of besieged towns to add to their strength.

Blind Coal, a popular name of Anthracite (q. v.).

Blind, Karl, was born at Mannheim, September 4, 1820, studied at Heidelberg and Bonn, and early became known as an impetuous advocate of German freedom and unity. He played a leading part in Hecker's rising in Baden in 1848, for which he was subsequently exiled. Later he headed the second republican insurrection in the Black Forest, when he was captured, tried, and sentenced to eight years' imprisonment. Liberated by the people, he was sent by the Provisional Government on a diplomatic mission to Paris, where he was arrested on a charge of implication in Ledru Rollin's movement in favour of the Roman Republic. After much public discussion, B. was finally banished from France. He has since resided in Belgium and England, actively engaged in a democratic propaganda. B. is an honest enthusiast, who is ready to turn the world upside down in the interests of humanity. Politically he belongs to the order of 'Irreconcilables.'

Blind'ness may exist in any degree, from the smallest impairment of vision to total loss of sight. This state may be congenital, or it may occur at any period of life, but most frequently in old age. It may arise from many causes, as disease of the brain, rendering the person unable to recognise the impressions produced in the eye by the rays of light. B. may be the result of disease of the optic nerve or of the retina. It may arise from inflammation of any of the structures composing the eye, or from affections of the crystalline lens and humours of the eye. It may also be due to adhesions of the eyelids or to absence of the eyeball. Whatever tends to obstruct the rays of light as they pass through the eye may be said to cause B. The different kinds of B. will be treated under the various affections that constitute B., as amaurosis, cataract, glaucoma, &c. Day-B. (*Nyctalopia*) is a peculiar condition in which vision is most powerful during twilight, due to a kind of amaurosis, and exists among those who are confined in dark cells. Night-B. (*Hemeralopia*) is the converse of day-B. The patient sees only in broad daylight, but not at all at other times. It is common in India and other tropical countries, caused by the exposure of the eyes to a burning sun. The treatment consists in protecting the eyes by a shade. A similar affection is common among the Esquimaux and those engaged in Arctic travelling, called Snow-B. This affection is caused by the reflection of light from the snow. See COLOUR BLINDNESS.

Blind'story, in ecclesiastical architecture, is the second or middle arcade in that wall which separates the body of a church from the aisles. In cathedrals it serves to give access to different parts of the building. Its apertures admit no light, and thus B. is opposed to *Clerestory* (q. v.), the third arcade, which admits light. B. is also called the *trifonium*.

Blind'worm, a name given to the *Ceciliada*, a group of *Amphibian Vertebrata* (see BATRACHIA), but more commonly applied to indicate the slow-worm (*Anguis*), included in the *Lacertina*, or Lizard order of reptiles, which is represented by the common blind or slow worm (*Anguis fragilis*) of Britain, Europe, Asia, and N. Africa. The slow-worms are included in the family *Scincida*. In length the common species measures from

10 to 15 inches. The tail is blunted, the body being of almost equal thickness throughout, and covered by very small scales. The tongue is free, fleshy, and slightly notched at its tip. The teeth are very small; and although it has been credited with venomous properties, it is perfectly destitute of such, and is altogether harmless. No limbs are outwardly developed, and although a true lizard, its appearance is decidedly serpentine. It feeds upon snails, insects, and worms. The specific name *fragilis* is derived from its habit of stiffening the muscles of the body when touched, so as to cause the tail readily to be broken off, as if exceedingly brittle. The young are produced from eggs, but in a living state (*ovo-viviparously*); and although termed 'blind,' the eyes are well developed, but of small size. The amphibian *Ceciliada* above alluded to are snakelike forms found in Java, Ceylon, and S. America. The eyes are rudimentary, and are concealed beneath the skin. They burrow in marshy ground; and the young, as in all *Amphibia*, possess external gills in early life.

Blis'tering Flies. See CANTHARIDES.

Blis'ters are substances used medicinally to produce counter-irritation. When applied to the surface of the body they raise the cuticle by causing serum to be exuded between it and the true skin, and thus form a vesicle. This vesicle should be punctured to allow the serum to escape, but the raised cuticle is not to be removed except in those cases in which a running sore is to be maintained. When this is desirable, it can be promoted by applying a second blister or some irritating substance, as savin ointment. B. should be dressed with lard and cotton wadding, great care being taken not to irritate the blistered part.

The substances used to produce B. are *boiling water*, strong ammonia, vinegar, cayenne pepper, mustard, turpentine, and cantharides. Of these, cantharides, either as a plaster or as *blis'tering fluid*, is by far the most common substance for producing B. It is generally allowed to remain for ten or twelve hours applied to the part.

Uses of B.—They are generally applied to relieve deep-seated pain in inflammation and congestion of internal organs. B. are also extensively applied to remove glandular swellings and other tumours. B. are very useful in removing fluid from internal cavities, especially in pleurisy and pericarditis. B. form the best application to indolent and callous ulcers.

B. should be used very cautiously in infants and old people, as they are very apt to produce great depression, and not unfrequently in such cases produce troublesome sloughing wounds. In all such cases it is best to remove the blister after a few hours, and afterwards apply a poultice. B. are to be avoided in all cases of inflammation of the kidneys, on account of the tendency of cantharides to produce bloody urine. Other remedial agents act in much the same way as counter-irritants, but produce a pustular eruption instead of vesicles, the chief of such substances being croton oil and tartar emetic.

Blis'ter Steel, a variety of steel, showing, when broken across, a fine granulated texture, and marked on the exterior with blister-like prominences of varying diameters. It is formed in a furnace in the process of converting bar-iron into steel by carburisation, which is effected by building up alternate layers of bar-iron and powdered charcoal, the upper layer of charcoal being covered over with a damp siliceous powder, the product of the wear of grindstones in the manufacture of steel articles, and keeping the whole at a red heat for from seven to ten days. The blisters are supposed to arise from a part of the charcoal cement combining with the oxygen of the included air to form carbonic oxide, which permeates the whole mass of iron carburising it, and rendering the surface vesicular. B. S. is employed in making files and tools of all descriptions. The first use of the process is unknown, but it was described at length by Reaumur in 1722.

Bloch, Marcus Elieser, a Jewish physician and ichthyologist, was born at Anspach, Bavaria, 1723, graduated as M.D. at Frankfurt, and settled at Berlin, where he died, 6th August 1799. His great work is *Allgemeine Naturgeschichte der Fische* (with 432 coloured plates, 12 vols. Berl. 1782-95). His *Systema Ichthyologia Iconibus CX illustratum* was left unfinished, and was published by Schneider (Berl. 1801).

Block, a nautical term, meaning the case or shell which contains the wheel or sheave of a pulley. A *tackle* is two or more blocks with the rope. The B. is called single, double, treble,

fourfold, according as it contains one, two, three, or four sheaves. The manufacture of this important part of a ship's rigging, so necessary for raising sails, tightening ropes, and other purposes, was carried on by hand till the year 1781, when a Mr Taylor invented and patented a process for making sheaves and sheaves. The late Sir Mark Isambard Brunel set up his ingeniously invented machinery in the dockyard at Portsmouth between the years 1802 and 1808. A duplicate of it was erected at Chatham about 1807. By this machinery every operation connected with the making of a B. is performed. It cuts up the rough timber, and polishes the iron for the pin on which the sheave turns. There is a machine for boring, for mortising, for shaping, for scoring, and for many other minute purposes. The whole of the machinery is put in motion by straps passing over drums, and is driven by a steam-engine of 32-horse power. By means of it, ten men can with ease finish from 130,000 to 140,000 blocks of different sizes in a year. The B. is made of elm, the sheaves of *lignum vita*, and the pins are made of iron prepared so as to reduce friction as much as possible. The importance of this invention will be seen when it is mentioned that a single line-of-battle ship requires about 1430 of these articles for her equipment. Brunel received £20,000 for the invention, and for superintending the erection of his machine.

Blockade, in military or naval tactics, signifies the effectual stoppage, by a circle of fortifications or men-of-war ships, of all means of external communication with the garrison of a besieged fortress or port. If resistance is determined on by the garrison, the governor places the civilians (if any) under strict military rules; superintends the consumption of food, which is regulated as economically as possible; and makes frequent sorties, so as to at least retard, if not prevent, the complete investment by the enemy.

Blockade, in international law, means the rendering of intercourse with the ports of an enemy unlawful on the part of neutrals. In England, it has always been held that a B., to be valid, must be effective—that is, that there must be a force of ships sufficiently near the port to make it dangerous for a vessel to attempt to enter. On the Continent less strict conditions have generally been held to constitute a valid B. The French have held that a ship attempting to run the B. was entitled to warning, and that seizure was not legal until an act was done in defiance. To be binding on neutrals, a B., besides being effective, must be presumably known to them. Official notification ought, therefore, to be made of the fact.

A breach of B. may be made either by coming out of or going into the blockaded port. It subjects vessel and cargo to confiscation by the blockading power. A B. can only be maintained during war. It ceases on the proclamation of peace.

Block-house bears the same relation to a temporary fortification that a tower does to a permanent one. It is especially useful in a wooded country, where it is quickly raised, and where it is not easily attacked by large guns. The form is either rectangular or like a Greek cross, preferably the latter. The roof is composed of 3 or 4 feet of earth, strong and fire-proof; the walls are provided with port-holes, through which the besieged may fire; and a ditch is not unfrequently dug round it, thus preventing the near approach of the enemy. If opposed to artillery, the walls must be composed of two rows of trunks, with earth rammed firmly in between them.

Block Printing. See PRINTING.

Blocksberg, the name of several mountains in Germany, and, in particular, the popular name of the Brocken (q. v.), a famous eminence of the Hartz Mountains, on which the witches were popularly believed to hold their orgies on *Walpurgisnacht*, the night between the 30th of April and the 1st of May.

Block System. See RAILWAY.

Block Tin. In order to purify crude tin, it is subjected to the process of *liquation*. This consists in gradually heating ingots of the metal on the bed of a furnace, when the purer or *grain tin* fuses first and runs off, leaving an impure and less fusible alloy, containing, in addition to tin, iron, copper, lead, arsenic, and antimony. This alloy when remelted forms B. T.

Blois (Lat. *Blesia*), the capital of the department of Loire-et-Cher, France, 35 miles S.W. of Orleans by rail, beautifully situated on the right bank of the Loire, here crossed by a fine bridge

of eleven arches. It is the see of an archbishop, and has a communal college, a botanic garden, and a public library of 20,000 volumes. Its manufactures are chiefly porcelain, lace, and hoisery, and there is some trade in brandy, wine, and timber. Pop. (1872) 14,496, including the suburb of Vienne. B. contains a cathedral, a Roman aqueduct, which supplies the public fountains, and an ancient citadel, partly built in the 15th c., famed for its historical associations. In this castle Louis-XII. was born, and the Duc d'Alençon and Marguerite of Anjou, and also Henry IV. and Marguerite of Valois, were married; in it François I., Henri II., Charles IX., and Henri III. held their courts; and within its walls the Duc de Guise and his brother were murdered in 1588. At B. have been concluded numerous treaties. In the Franco-Prussian war, the troops of Hesse-Darmstadt here gained a striking victory over the French, June 28, 1871.

Blomfield, Charles James, an eminent English Churchman, was born at Bury St Edmund's, May 29, 1786. He studied at Trinity College, Cambridge, where he distinguished himself highly, and was elected fellow in 1809. In 1813 he became domestic chaplain to the Bishop of London, in 1821 Archdeacon of Colchester, in 1824 Bishop of Chester, in 1828 was translated to the see of London, and after a laborious and energetic career, died at Fulham, August 5, 1857. B. edited four of the tragedies of Æschylus; the *Fragments of Callimachus* Sophron, of Sappho, and Alcaeus; contributed to the *Edinburgh* and *Quarterly Reviews*; and published sermons, lectures, pamphlets, &c. But his principal distinction was gained by his activity in the management of his diocese, and by his exertions for church-extension. His efforts for the suppression of certain offices in cathedrals, that their revenues might be applied to the augmentation of the smaller livings, subjected him to the unenviable satire of the Rev. Sydney Smith. See *Life of Bishop B.*, by his son Alfred (2 vols. Lond. 1863).

Blommaert, Philip, Flemish *littérateur*, born about 1809, earned some reputation as a poet in 1834, but is now best known by his careful editions of Flemish poems of the middle ages, as the *Theophilus* (Ghent, 1836) of the 14th c., and the *Oud-vlaemsche Gedichten* ('Old Flemish Poems') of the 12th, 13th, and 14th centuries (3 vols. Ghent, 1838-51). He also translated the *Nibelungen* into Flemish iambs; but probably his greatest work is his History of the Belgians (*Aloude Geschiedenis der Belgen of Neder Duitschers*, Ghent, 1849), in which he shows strong Teutonic sympathies. B. died at Ghent, 14th August 1871.

Blon'del, properly **Blondiaus**, also **Blondel de Neale** or **Néale**, so named from his birthplace in the old French province of Picardy, a minstrel and poet of the 12th c., was the favourite comrade and brother-poet of Richard Cœur de Lion of England. His name has, however, been immortalised, after a fashion, by a beautiful but baseless tradition, which tells how Richard, kidnapped and hidden away in prison by Duke Leopold of Austria, was sought for and at last found by the faithful B., who wandered through Austria in disguise, until he finally came to a fortress in which a distinguished prisoner was said to be confined. Approaching close to the place, B. chanted a stanza of troubadour song well known to himself and to Richard, and was overjoyed to hear it answered from within in the voice of the King. Having thus discovered his master's prison, B. hurried back to England, where the required ransom was soon obtained, and the royal prisoner freed. The only ancient source for this tale is the Chronicle of Rheims belonging to the 13th c. (Par. 1836); all earlier records, English, French, and Austrian, are silent in regard to B. Even the songs of the *trouvères* Blondiaus and of King Richard, published by Tarbé (*Les Œuvres de B. de Néale*, Rheims, 1862), furnish no trace of the legend. But after the 15th c. the story began to spread, and its beauty has since won for it an abiding place in the human memory, if not in history. In the work of Tarbé's referred to, he has gathered together everything relating to the legendary and the historical B.

Blood, the most important fluid of the body, is a somewhat clammy liquid, a little heavier than water, its specific gravity being 1052 to 1057, water being 1000. It has a saltish taste, a peculiar odour, and is alkaline. In man and the higher mammalia it is florid red in the arteries, and dark purple in the veins. To the naked eye it appears a homogeneous liquid, but when

examined with a powerful microscope it is found to consist of a colourless fluid called the *liquor sanguinis*, in which float numerous corpuscles. These corpuscles are of two kinds, red and colourless corpuscles. The red are by far the most numerous, and are smaller than the white corpuscles. In man the red corpuscles are circular biconcave disks, and in B. drawn from the body have a tendency to run together, adhering to one another by their flat surfaces like pieces of coin piled one above another, forming cylindrical columns. This is easily seen under a powerful microscope. The size of these red corpuscles in man has been estimated at $\frac{1}{2500}$ to $\frac{1}{3000}$ of an inch in diameter. In quadrupeds they are generally smaller than in man, in the elephant, however, they are larger. In reptiles and amphibia they are much larger. The largest corpuscles yet observed are in the *protus*, in which they are about $\frac{1}{100}$ of an inch in length. The shape of these corpuscles varies in different animals. In most mammals they are shaped as in man; in the camel, however, they are elliptical. In reptiles, fishes, and birds, they are generally more or less oval. In most of the invertebrate animals the corpuscles are colourless, and hence their B. is also colourless.

White or Colourless Corpuscles are much fewer, somewhat larger, and lighter than the red corpuscles. 'In man (during health) the proportion of white corpuscles to the red is 2 or 3 to 1000. This proportion is diminished by fasting and increased after a meal, especially of albuminous food. Their number compared with the red corpuscles is said to be greater in venous than arterial B., and it is much greater in the B. of the splenic and hepatic veins than in venous B. generally.'—*Quain's Anatomy*. In certain diseased states of the spleen, the white corpuscles are much increased. See LEUCOCYTHÆMIA, or WHITE-CELLED BLOOD.

Liquor sanguinis is a pale clear fluid in which the corpuscles float. It consists of fibrine and serum, and has a great tendency to coagulate. The fibrine is best obtained by stirring newly-drawn B. with a bundle of twigs, which entangle the fibrine. Fibrine exists in B. about $2\frac{1}{2}$ parts in 1000.

Serum of B. is a thin yellowish fluid, holding in solution about 10 per cent. of solids. It coagulates when heated owing to the albumen it contains. Serum also contains fatty matters and a peculiar nitrogenous principle called globulin, and certain salts, potash, and soda. Many chemists have carefully analysed B., but as that fluid is always changing, and differs very much in different parts of the body, it is impossible to give an exact chemical composition of B. The following, however, may give a general idea of its chemical constitution:—1. 1000 parts nearly 800 parts consist of water and the rest solid matters. This solid residue has nearly the same chemical constitution as flesh. The red corpuscles contain a principle termed *Globulin*, closely allied to albumen, and a colouring matter called *Hæmatin*. The hæmatin contains iron. The globulin, along with some colouring matter, forms the so-called B.-crystals. These crystals are very beautiful and are differently shaped according to the B. of the animal from which they are drawn.

Coagulation of B.—When B. is drawn from the vessels it very soon coagulates. This is due to the fibrine separating into a solid mass, entangling within its meshes the corpuscles, and allowing the serum to escape. In inflammation and certain other diseases the red corpuscles separate from the *liquor sanguinis*, and fall to the bottom before coagulation takes place, and the white corpuscles, on account of their lightness, float on the surface; and hence, when coagulation takes place, the clot is of a light colour, forming what has long been called the 'buffy coat.' Cold retards coagulation whilst moderate heat accelerates it. It is also much affected by chemical substances. It is retarded by acids and prevented by alkalis. Faintness promotes coagulation, whilst excitement, as a rule, retards it. The colour of the B. is due to the red corpuscles. These undergo a remarkable change in passing through the capillaries. The corpuscles then give off oxygen, which unites with the carbon of the tissues to form carbonic acid and render the B. dark in the veins. On the other hand, as the B. passes through the lungs it takes in oxygen, and again assumes the florid red colour of arterial B. The B. receives the products of digestion and carries them to the tissues, and receives the waste of the tissues to be excreted by special organs of which the kidneys are the chief. The quantity of B. in the human body is said to be above 30 lbs. in the male and less in the female. The B. varies much in

disease, but the special B. diseases will be treated under their respective heads. See CIRCULATION OF THE BLOOD, RESPIRATION.

Blood, Thomas, a singular and successful desperado, was born in Ireland about 1628, his father being according to one account a blacksmith, according to another an ironmaster. He served in the Parliamentary army in his own country, and the desperate character of the man was shown in a plot which he made after the Restoration to seize Dublin Castle and the person of the Duke of Ormond, the Lord-Lieutenant. The plot was discovered, and B. fled the country. After a wandering life in Holland, Scotland, and England, he placed himself at the head of another conspiracy against the Duke of Ormond, seized him in his coach on 6th December 1670, and all but succeeded in having him hanged at Tyburn. Singularly enough, he was never suspected of having had anything to do with this desperate villainy, although there is some reason to think that he was screened by the Duke of Buckingham, if not hired by him for the purpose. His next exploit was the most daring of all. Disguised as a clergyman, he attempted with two accomplices, May 9, 1671, to carry off the regalia from the Tower. He was, however, seized with the crown in his possession, and thrown into prison. There he was visited by Charles II., whom he so alarmed by a statement that he was at the head of a large band of conspirators who would certainly avenge his death, that the king not only pardoned him, but gave him a pension of £500 a year. 'Colonel' B., as he was called, became indeed an influential person at court. Subsequently, however, he fell out with Buckingham, made a scandalous imputation against him, and was imprisoned. He was, however, admitted to bail, and he died in his own house, 24th August 1680.

Blood, Avenger of, the man whose duty it was, according to a custom yet in vogue among nations of patriarchal habits, to avenge the death of a murdered relative, unless a certain compensation or B.-money were paid by the murderer. The Mosaic law was peculiar in preventing the escape of the wilful murderer by the payment of B.-money, in restricting the vengeance to the offender himself, and in providing means for the escape of an unintentional manslayer. See NUMB. XXXV., and CITIES OF REFUGE.

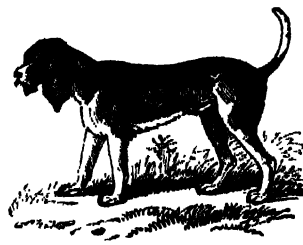
Blood, Corruption of. See TREASON.

Blood, Eating of, prohibited Genesis ix. 4, and frequently in the Mosaic law, generally in connection with sacrifices. The prohibition was renewed by the council of apostles and elders at Jerusalem (Acts xv. 29), but coupled with things offered to idols, an evident compromise between Christian liberty and Jewish prejudices. The Koran, too, enjoins abstinence from B. and from things offered to idols.

Blood-Bird (*Myzomela sanguinolenta*), a species of Honey-eater (q. v.), a native of New South Wales, and named from the scarlet colour of its body, except the wings and legs.

Blood-Flower (*Hemantus*), a genus of bulbous-rooted plants (natural order, *Amaryllidaceæ*), which gets its name from the colour of the flowers of most of the species. There are about fifteen or sixteen species, nearly all natives of the Cape of Good Hope, and many of them cultivated in our conservatories. Most of them are poisonous. The inspissated juice of *H. toxicarius* is used by the Bushmen to poison their arrow points.

Bloodhound, a breed of hounds known also by the name 'Sleuth-hounds,' possessing a broad-chested, muscular body. The ears are large and pendant, as also are the overlapping upper lips. The usual colour is a tan of various shades, interspersed with black. These dogs have gained an unenviable reputation, from their having been used to track fugitives, and especially runaway slaves. The breed has lately declined in Europe, although in America, but more particularly in Cuba, these dogs are still bred for the purposes above noted. They are not naturally fierce, but possess a powerful and acute scent; and are trained to show a great



Bloodhound.

amount of dogged perseverance in following up the trail, as well as to exhibit ferocious traits. The Cuban B. is a variety more nearly allied in general conformation and in ferocity to the bulldog. It is still used in Cuba in tracking slaves.

Blood-letting may be either general or local. General B. consists in abstracting blood from the general circulation. This may be effected from an artery (arteriotomy), or from a vein (venesection or phlebotomy). When from an artery, it is usually the anterior branch of the Temporal Artery (q. v.). The vessel is cut obliquely but only punctured, care being taken to have the wound in the integument much larger to allow the blood freely to escape. When sufficient blood has been drawn, the artery is to be completely cut across and a pad and bandage are to be applied. In venesection, blood is generally drawn from the arm. A bandage is tied above the part to be opened, sufficiently tight to obstruct the blood in the veins, but not tight enough to interfere with the flow of the blood in the arteries. It is generally the median Cephalic Vein (q. v.) which is selected. The vein is opened obliquely, and when sufficient blood is abstracted, the bandage is untied and a pad and bandage applied to the wound. In certain cases B. is performed on the external Jugular Vein (q. v.) in the neck. B. is now seldom resorted to in surgical practice. At one time it was universal in all inflammatory diseases, and even a common occurrence for the most trifling complaints, and in many instances for no disease whatever. Now it is rare in any instance. This change has been brought about partly by an alteration in the type of disease, but chiefly by a more correct knowledge of the nature of disease, and of the proper medicines to be applied. Local B. is more advantageous, especially to relieve local congestions, and may be performed by simple incisions, by cupping, or by leeches. See CUPPING and LEECHES.

Blood of our Sa'viour, an order of knighthood limited to twenty knights, instituted by the Duke of Mantua in 1608. The Dukes of Mantua were sovereigns of the order, the name of which was suggested by the preservation in the Church of St Andrew, Mantua, of what were believed to be some drops of the B. of Christ.

Blood of St Janua'rius. See JANUARIUS, ST.

Blood-root. See GRUM, HÆMODOREÆ, and SANGUINARIA.

Blood-stone. See HELIOTROPE.

Bloom (Old Eng. *bloma*), originally a mass of malleable iron obtained by direct reduction of the ore in a hearth or bloomery. The word is now used in ironworks for the spongy mass of iron taken from the puddling-furnace. See IRON.

Bloom, in art, an appearance on the surface of paintings resembling in some points the B. of certain fruits, which destroys the transparency of the picture, and is caused by moisture in the varnish or on the picture before varnish is laid on. It is removed by sponging the picture with hot camphine, smoothing with a soft brush, and drying in the open air. Most pictures painted nowadays are not varnished at all.

Bloom'erism, a momentary fashion in ladies' dress, originating in America in connection with the female rights movement. It took its name from Mrs Anne Bloomer, who, in 1849, adopted and advocated the so-called reform. The dress originally consisted of a jacket with close sleeves, a skirt reaching a little below the knee, and trousers. The dress subjected its wearers to a good deal of ridicule and even social persecution, and although some more or less graceful modifications of it have been suggested, it has never become popular here or even in America.

Bloom'field, Robert, one of the best English pastoral poets, was born in 1766, at Honington, Suffolk, where his father was a poor tailor. He worked first as a farm-servant, then as a shoemaker in London, and after unsuccessful efforts in various occupations, died at Shefford, in Bedfordshire, August 19, 1823, deprived of memory and almost of reason. His chief works are *The Farmer's Boy* (composed in a London garret), *Rural Tales*, and *Wild Flowers*. They are admirable for their charming artlessness, fidelity to nature, and fresh, honest flavour of rusticity. They have been often reprinted.

Blouse, a light, loose, blue over-garment, worn especially by the working-men of France, who are hence called *blousers*. A white B. is Sunday dress. The smock-frock of the English waggoner and farm-labourer is now frequently called a B. It is made of coarse, under-bleached linen, and is plaited and embroidered on the breast and shoulders. It is sometimes worn by butchers in the Lowlands of Scotland, the colour being blue, as in France. It is worn blue also in Germany, where the B. is frequently tightened by a belt.

Blow-Fly, or **Flesh-Fly** (*Sarcophaga carnaria*), a genus of Dipterous insects or flies, belonging to the *Muscidae*, or family including the domestic fly, &c. The adult B.-F. possesses a yellowish head, a greyish thorax, whilst the abdomen is coloured of a blackish-brown with a bluish or metallic lustre. The eyes are set apart in both males and females. The body is hairy. The wings may measure an inch in extent. The eggs are deposited in decaying flesh and organic matter, or upon the bodies of living animals (e.g., sheep), in the skin of which the larvæ cause much irritation or even serious disease. Sometimes the eggs appear to be hatched within the parent body, the flies being thus ovo-viviparous. Another species (*S. mortuorum*) is said to inhabit cemeteries and graveyards, this form being distinguished by a red line or mark on the front of the head. The larval flies, deposited in decaying matter, do good sanitary service by removing putrescent material from the earth's surface.

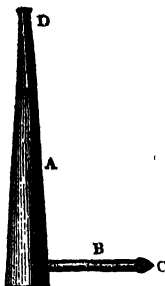
Blowing Machines are instruments for producing blasts or currents of air, and are used for exciting combustion or generating a great heat. The common bellows is one of the simplest in use, and very primitive forms are met with among uncivilised nations. All, however, work on the same principle—viz., by contracting the dimensions of the space within which a quantity of air is confined, and thus forcing the air out with a velocity proportional to the pressure and to the smallness of the aperture. The space is refilled by taking advantage of the elastic properties of air as a gas. A serious objection to such machines as the common bellows is the want of a continuous blast, and to remedy this defect, various improvements have been suggested, such as the use of two bellows. This, however, was soon superseded by the double bellows, which consists of two contiguous chambers, connected by a valve opening into the upper one, with which the exit-pipe is connected. The upper chamber is filled by compression of the lower one, which is itself refilled by merely permitting it to open by the gravitating weight of the lowest board, which is also provided with an inlet valve.

In blast furnaces, the blowing arrangement is somewhat more complicated, and is worked by a steam-engine. There is an ordinary steam-cylinder at one end of the beam, and at the other is a blast-cylinder. This latter is provided with an air-tight piston, connected with the beam by a piston-rod, and with several inlet valves and an outlet valve at each end. The outlet valves both open into the exit-pipe. Suppose, now, the piston to be at the top of the cylinder, the lower part of which is filled with air. As the piston descends, the inlet valves below are closed, and the compressed air escapes through the outlet valve into the exit-pipe; but at the same time the pressure of the external atmosphere opens the inlet valves above, and fills the upper portion of the cylinder with air, which is, in its turn, forced into the exit-pipe by the ascending piston. Meanwhile, the lower portion of the cylinder is being refilled with air through the inlet valves, and thus the operation is repeated and a tolerably continuous-blast produced.

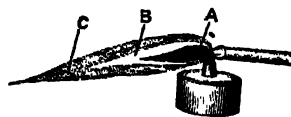
Another important blowing machine is that known as the *fanning machine* or *Fanners* (q.v.), originally used as a winnowing machine, but now applied to purposes of ventilation, heating, drying, water-raising, &c. It consists usually of a wheel with fans instead of spokes, rotating in a box, open at the centre, and shaped spirally with respect to the wheel. The air sucked in at the centre is driven to the extremities of the fans, and forced round till it finds its exit along a pipe fixed tangentially into the box. There are various modifications of this, such as Chaplin's double fans, and Platt & Shiele's silent fans, which latter are provided with curious-shaped vanes.

Blow-pipe. The B. is an instrument of great value to the chemist and mineralogist for detecting the presence of many elements and their compounds in substances to be analysed; it is also employed in the arts for soldering and glass-blowing. The

discovery of the B. is ancient, but its application to analysis comparatively modern, having been introduced by the Swedish chemists of the last century. Many forms of the instrument are made, but the simplest is that invented by Black, and known as Black's B. It consists of a conical tube made of sheet-iron (A), at the wide end of which is attached a thin brass tube (B), provided with a nozzle of brass or platinum (C). In using the instrument, the narrow extremity (D) is placed in the mouth, and the nozzle applied to the flame of an oil or gas lamp; a steady blast of air is then forced from the mouth through the nozzle against the flame. The B. flame consists essentially of three parts: A is a non-luminous cone in which is a mixture of unburnt combustible gases and atmospheric air, both at a low temperature. B is luminous, and consists of burning gases containing an excess of carbon and carbonic oxide; whilst at C the flame again becomes less luminous, owing to the abundant supply of oxygen, which deprives it of its combustible materials; the temperature of C is exceedingly high, particularly in the neighbourhood of the point of B. If any easily reducible compound—such, for instance, as the oxide of lead—



Black's Blowpipe.



Blowpipe Flame.

be applied on a suitable support to B, the unburnt carbon combines with the oxygen of the oxide at the high temperature to form carbonic oxide, and lead becomes separated or reduced. B is therefore called the *reducing* or *inner* flame; whilst C, on account of its oxidising properties, is called the *oxidising* or *outer* flame. The following are the more important B. tests: (1) The substance placed in a cavity scraped in charcoal, and mixed with carbonate of soda, is heated in the reducing flame; if it contain antimony, arsenic, bismuth, copper, lead, silver, or tin, these metals become separated in *beads*, and may be recognised by their physical properties, and often by the incrustation of metallic oxide left on the charcoal. (2) The substance is heated on platinum wire in the hottest part of the flame; if barium, calcium, potassium, sodium, or lithium are present, the flame assumes a characteristic colour. (3) The substance is heated on platinum foil after it has been moistened with nitrate of cobalt; if aluminum, magnesium, or zinc is contained in it, the resulting mass is blue, pink, or green, as the case may be. (4) A small particle of the substance, together with some borax, is heated on a loop of platinum wire before the flame; the resulting borax *bead* becomes coloured if chromium, cobalt, copper, iron, manganese, or nickel be present, the colour varying in some cases according as the bead is heated in the inner or outer flame.

Blowpipe and Arrow, a native weapon found among several tribes of S. American Indians, who use it with great skill and precision. The pipe is a straight tube formed of the small palm stem, and is usually from 8 to 12 feet long. The arrows, which vary much in length, are made to fit exactly the hollow of the pipe by means of the down of the silk-cotton tree, and are expelled with great force by blowing through the tube.

Blubber. See CETACEA, WHALE, and WHALE-FISHERY.

Blücher, Gebhard Leberecht von, Prince of Wahlstadt, a distinguished Prussian commander, belonged to one of the oldest Mecklenburg families, and was born at Rostock, Mecklenburg-Schwerin, December 16, 1742. He entered the Swedish service at the age of fourteen, but being captured by the Prussians, joined the standard of Friedrich the Great. He served during the Seven Years' War, and rose to the rank of captain. Being, however, offended at what he imagined to be a slight passed upon him, he requested his discharge, and Friedrich granted it, in a *brusque* manner telling him he 'might go to the devil if he pleased.' After a few years spent in retirement on his Pomeranian estate, B. returned to the army, and served with considerable distinction, particularly as a leader of cavalry, in 1792, 1793, and 1794. In 1806 he commanded the advanced guard at the battle of Auerstadt, and defended Lübeck with

great obstinacy. Taken prisoner, he was soon exchanged for Marshal Weber, and kept persistently rousing his country against Napoleon, until it did rise. In 1813 he fought bravely at Lützen, defeated Macdonald on the Katzbach, and aided greatly in achieving the victory of Leipsic, obtaining from the Russians, on account of the rapidity of his movements, the nickname of 'Marshal Forward.' Crossing the Rhine on the 1st of January 1814, he fought desperately against Napoleon, sometimes winning and sometimes losing, but always cheerful, confident, and stubborn. Finally his victories at Laon and Montmartre in March crushed his once terrible foe, and on the 31st of that month the 'old captain of hussars' rode proudly into Paris. On following the allied sovereigns into England, B. was received with great enthusiasm. In 1815, after Napoleon's escape from Elba, he was again appointed to the command of the Prussian troops; and although beaten and all but killed at Ligny, he brought up his troops in time to make the battle of Waterloo decisive. He once again entered Paris, and, remembering what shame and disgrace Germany had suffered at the hands of France, would have allowed his men to plunder it had he not been restrained by Wellington. B. was honoured by his king and country as a hero. Statues were erected to him; he was made Prince of Wahlstadt, and the estate of Kriebowitz, in Silesia, was bestowed upon him. There he died, September 12, 1819. As a man, B. was open-hearted but uncultivated; as a soldier he was intrepid, rapid in movement, and indifferent to defeat. Nothing could daunt the spirit of the man, but his strategy was not remarkable for its skill, and was utterly unlike the profoundly scientific style in which Prussia went to work against Austria (1866) and against France (1870). B.'s intense patriotism helped the great cause of the unification of Germany, which has been accomplished in the present day. See Varnhagen Von Ense's *Lebensbeschreibung B.'s* (Berl. 1827); Schöning's *Geschichte des Preuss. 5 Husarenregiments mit besonderer Rücksicht auf B.* (Berl. 1843); Bieske, G. L. *Blücher von Wahlstadt* (Berl. 1862); Scherr, B., *Seine Zeit und Sein Leben* (Leips. 1862). For an interesting account of the ancient and honourable family to which B. belonged, see Wigger's *Geschichte der Familie B.* (1871).

Blue, one of the so-called primary colours, seen in nature in the clear expanse of the heavens. From the azure vault, the colour B. has acquired a peculiar significance, and in mediæval times it was taken as the emblem of eternity and immortality. The Virgin Mary, represented in a B. mantle, symbolised virginal modesty, and angels in B. garments were typical of faith and fidelity. In heraldry, B. is regarded as an emblem of chastity, loyalty, and fidelity. Its significance extended to its combinations with other colours; thus purple in which red predominated indicated love of truth, while B. purples were emblematic of the truth of love. The connection of B. with fidelity still lingers in popular apprehension in such an expression as 'true B.'

B. dyes are not numerous, and before the discovery of the aniline or coal-tar colours, dyers principally depended for their blues on WOAD, ARCHIL INDIGO, and PRUSSIAN B. Now, a series of very brilliant blues and bluish-purples are obtained from coal-tar, and they are possessed of great tinctorial power and durability. Among these may be mentioned *bleu de Lyon*, or *bleu de Paris*, Nicholson's soluble B., and azurine (see DYEING and CALICO PRINTING). The principal B. colour used by painters is ultramarine, a brilliant azure colour, which was originally prepared from lapis-lazuli, a mineral found in China and other oriental countries. Ultramarine, as now prepared, however, is an artificial compound, prepared by roasting together certain proportions of China clay, carbonate of soda, sulphur, and charcoal (see ULTRAMARINE). Among other painters' blues may be enumerated Prussian B., and various modifications of the same base, by the addition of materials which alters its body, indigo, cobalt B., smalts, or powdered cobalt glass, and mountain B. or bice, prepared from carbonate of copper. The oxide of cobalt is an important basis of many blues in use besides the two above indicated, which are very extensively used in the colouring of pottery, porcelain, and glass. The various colours alluded to will be found more particularly detailed under their own names.

Bluebeard, the title of a French tale, the hero of which, a certain Chevalier Raoul, is distinguished by having a *blue beard*. The tale, which is too familiar to require analysis, has become ex-

tremely popular, especially in its nursery form, in all countries of Western Europe, and has formed the basis of several well-known dramatic compositions. It is thought that a certain Gilles de Laval, Seigneur de Riaz, marshal of France in 1429, a man whose acknowledged patriotism and valour were cast into the shade by his atrocious cruelty, was the original of the fictitious Raoul. Riaz was burnt alive in 1440, at the instance of Jean VI., Duke of Brittany. As his crimes are detailed in connection with charges of *diablerie*, it is probable that truth and fiction are inextricably intermingled.

Blue-Bell. See HYACINTH.

Blue-Bird, or Blue-Robin (*Sialia* or *Sylvia sialis*), a genus of Insectorial birds, included in the sub-family of the *Erythacinæ* or robins. It inhabits the United States of America in summer, and usually migrates southwards in winter to the W. Indies and tropical America. The B.-B. represents in America, from its familiar habits, the redbreast of Britain. It is coloured



Blue-Bird.

sky-blue in its upper parts, red or chestnut on the breast, and white on the belly, the colours of the female being less brilliant than those of the male. The song is very agreeable. The nest is built generally in the holes of trees, and the eggs, of a pale blue colour, number five or six. Two or even three broods are produced annually. The B.-B. rather exceeds our redbreast in size, but resembles the latter in the general shape of its body. These birds are remarkably pugnacious and courageous. Nearly allied species, or varieties, represent this bird farther north on the American continent, whilst it also occurs in Brazil, Guiana, Mexico, and the W. Indies.

Blue-Books, the printed publications of the British Parliament, so called from their being uniformly bound in blue paper, as those of the French Government, are named *livres jaunes* ('yellow-books'), from a similar circumstance. They have been published regularly since the beginning of the 18th c., and consist chiefly of the votes and proceedings, acts of Parliament, the estimates, correspondence connected with matters of discussion, and reports of commissions. Those of a single session now form a collection of some sixty large folio volumes, which, though containing papers on the utmost diversity of subjects, treated on no regular principle, are rendered handy and coherent by means of annual indexes. In the United States the name is applied to a book containing the names of all persons in the Government service, together with their salaries.

Blue-Bottle Fly. See FLESH-FLY.

Blue Cardinal. See LOBELIA.

Blue-Coat School, the common name of Christ's Hospital (q. v.), arising from the circumstance of the boys wearing blue coats or gowns.

Blue-Eye (*Entomyza cyanotis*), belongs to the family of Honey-eaters (q. v.), and is a native of Australia. It is gregarious, and one of the most pleasing sights in the Australian bush is afforded by the flocks of blue-eyes flitting from tree to tree sipping the honey from the flowers with their long tongues. They also eat small insects, and berries in the winter-time.

Bluefields, a river rising in Nicaragua, Central America, and flowing through the Mosquito territory to the Caribbean Sea, which it enters about 210 miles S. of Cape Gracias a Dios. At its mouth is situated a small town of the same name (pop. 600), the residence of the ruler of the Mosquito territory.

Blue-Gowns, a class of privileged beggars popularly so called in Scotland. They had a small royal bounty. The last of them drew his last allowance from the Exchequer in Edinburgh in 1863. See *Batemans*, under BEAD.

Blue-John, the name given by miners to a rich violet-blue variety of Fluor-spar (q. v.), found abundantly in Derbyshire, and manufactured into vases, &c.

Blue-Mantle, the title of a pursuivant-at-arms in England. See PURSUIVANT.

Blue Mountains.—(1) A range of mountains which traverses the island of Jamaica (q. v.) from E. to W. It is densely wooded, abounds in splendid scenery, and varies in height from 5000 to 7000 feet.—(2) A mountain-chain in New S. Wales, extending, strictly speaking, from 34° to 33° S. lat., but often popularly regarded as reaching to 32° S. lat. The B. M. in their proper signification consist of two parallel ranges, of which the western one is the higher. They are full of gloomy ravines and fearful precipices, and the two ranges are divided by an immense chasm 1500 feet deep. The character of these huge fissures has been graphically depicted in the following sentence: 'Narrow, gloomy, and profound, these stupendous rents in the bosom of the earth are enclosed between gigantic walls of sandstone rock, sometimes receding from, sometimes overhanging, the dark bed of the ravine and its black silent eddies, or its foaming torrent of water.' The highest peak is Beemarang, 4100 feet; and the average height of the range is 3300 feet. The B. M. are now traversed by a railway, which attains at Blackheath station a maximum height above the sea of 3494 feet. The ascent from the plains on either side of the range is made by 'zigzags.' The western one is a remarkable specimen of engineering skill.

Blue Pill, the *Pilula hydrargyri* of the Pharmacopœia, consists of 2 parts of mercury, 3 of confection of roses, and 1 of liquorice powder. The dose is 3 to 8 grains (one or two pills). This is a useful pill when a mild mercurial is indicated. It is less liable than certain other preparations of mercury to cause irritation. It is useful in certain sluggish states of the liver and bowels, but, like all preparations containing mercury, should be administered with great caution. This pill may be used to produce the constitutional effects of mercury when that is considered desirable. The medicinal effects of B. P. as a mercurial will be treated under MERCURY (q. v.).

Blue Ridge, the eastern range of the Appalachians (q. v.), United States, extending almost continuously from New York to Georgia. The highest peak is Mount Mitchell in North Carolina, which has an altitude of 6470 feet.

Blue Shark (*Carcharias glaucus*), a genus of true sharks common in the Mediterranean, but sometimes occurring on the southern coasts of Britain. The head is pointed and flattened, the teeth being sharp and notched at the edges. No spiracles or breathing-holes, placed on the top of the head, exist in this form. These sharks attain a length of eight feet or more, and are of voracious disposition, feeding chiefly upon fish. The B. S. is said to manifest a close attachment to their young. The common or white shark (*C. vulgaris*) is a nearly allied form. See SHARK.

Blue Skate (*Raja batia*), a genus of skates, sometimes also, from its bluish-grey colour, named the grey skate. This form possesses a rhomboidal body. The tail is spineless, and two small dorsal fins exist far back on the tail. The females of this genus in Plymouth market are named 'maids,' and 'good wives.'

Blue-Stocking, a name applied to female pedants, and suggested by the blue stockings of a Mr Stillingfleet, a conspicuous member of a society of both sexes formed in London about 1780 for literary conversation. The name is generally used somewhat opprobriously, as indicating that the B.-S. indulges her literary tastes to the neglect of home duties.

Blue-throat, or Blue-breast (*Sylvia* or *Phenicura suecica*), a genus of Insectorial birds, rare in Britain, but found very generally distributed over the continent of Europe, averaging a robin in size, and possessing the throat and breast of a bright blue colour. In the centre of the blue patch a spot, white in some forms, and red in the adult males, exists. Beneath the blue, the front parts are barred with black, white, and chestnut colour. These birds are eaten in Alsace and Lorraine, and pass in Italy by the name of Becfin (q. v.), and Beccaficci (q. v.). Their song is very sweet, and they possess considerable imitative powers.

Blue-wing (*Cyanoptera discors*), an American genus of Anatida or ducks, resembling the teal, but of larger size; the males in full plumage being coloured black in the upper parts of the head, the rest of the head being blue, and a crescentic patch before each eye being white. The wings are coloured with various shades of blue; the upper parts being brown, glossed with green, and the under parts orange or reddish,

mottled with black. The tail contains fourteen feathers, and is of shortened conformation. This bird is named the blue or blue-winged teal in the United States of America. In summer these birds fly to the 57th parallel, but in winter they migrate southwards. In Jamaica, Texas, and elsewhere these birds are said to be permanent residents. The flesh is much esteemed for table.

Blum, Robert, a German political writer and agitator, was born of humble parentage at Cologne, November 10, 1807, and rose from the position of scene-shifter to that of manager in the Cologne theatre; afterwards holding a similar situation in Leipzig, where he cultivated letters and latterly became a publisher in 1847. Besides his contributions to various political and literary journals, he published along with Herloszsohn & Marggraf a *Theaterlexikon* (7 vols., 1839-42), with Steger, the political almanac, *Vorwärts* (5 vols., 1843-47), and independently, a *Staatslexikon für das deutsche Volk* (1847). In 1845 he distinguished himself in the German Catholic movement at Leipzig as a bold and eloquent speaker, and in 1848 was made vice-president of the provisional parliament at Frankfurt, performing his duties with characteristic vigour and intelligence. In the same year he was elected a member of the National Assembly, and became the leader of the Left, or democratic party. During the October rising in Vienna, along with Fröbel he conveyed a memorial of congratulation from the Left to the insurgents, but on the recovery of the city he was captured and shot, November 9, 1858. His son, **Hans B.**, born at Leipzig, June 8, 1841, was chosen a member of the Reichstag in 1866, and has been editor of the *Grünboten* since 1871.

Blumenbach, Johann Friedrich, a celebrated naturalist, was born at Gotha, 11th May 1752. After studying at Jena and Göttingen, he became (1778) ordinary Professor of Comparative Anatomy and Physiology at the latter university. These subjects he made the stepping-stone to the natural history of man, comparing men and animals with respect to cranial and facial developments, and originating in 1785 the classification of the human race into white, black, red, yellow or tawny, and Malayan. On these subjects and on the history of medicine he lectured for 50 years. B. died 22d Jan. 1840 at Göttingen, where a colossal monument to him was unveiled May 19, 1878. His *Handbuch der Vergleichenden Anatomie und Physiologie* (Gött. 1804; 3d ed. 1824), and *Handbuch der Naturgeschichte*, have been very popular all over Europe. His observations on skulls are contained in the *Decades VIII. Cran. div. Gent.* (1790-1828). His speculations on the generative principle (*visus formativus*) were valueless. See Marx, *Zum Andenken an J. F. B.* (Gött. 1840).

Blumenthal, Leonhardt Von, a distinguished Prussian general, was born at Schwedt on the Oder, July 30, 1810, educated in the military academies of Culm and Berlin 1820-26, and received the appointment of lieutenant in 1827. After holding various minor posts, he was raised (1849) to the general staff, and appointed to the command of the Slesvig-Holstein army. He was twice subsequently employed to convey to England special military propositions. In the Danish war of 1864, however, came his first great military success, when his strategical ability was so decidedly shown in the taking of Missunde, the storming of the trenches at Duppel, and in the passage to the island of Alsens. In acknowledgment of these services, he was raised to the rank of major-general. B. afterwards greatly distinguished himself in the Austro-Prussian war of 1866, and on the outbreak of the Franco-Prussian war was appointed chief of the general staff of the army of the Crown Prince. To the skilful operations of B. in the latter campaign were in great part due the catastrophe of Sedan and the capture of Paris.

Blunderbuss is a short and wide-bored musket, capable of taking in several bullets at once. It is destructive only at close quarters, and is now almost entirely superseded by the carbine. (The name is a corruption of the Dutch *donderbus*, 'thunder-gun.' Comp. Ger. *donnerbüchse*.)

Blunt'schli, Johann Kaspar, a distinguished Professor of Political Science in Germany, was born at Zürich 7th March 1808. He studied at Berlin (1827) under Savigny, and afterwards at Bonn under Hasse and Niebuhr. In 1833 he was appointed a professor in the newly-founded university of his native town, went to Munich in 1847, and accepted a call to Heidelberg in 1861, where he has since remained. B.'s career has been active and patriotic. Averse to the narrow and schis-

matical Radicalism of the German democrats, he has laboured unweariedly to create a national party which should be at once liberal in politics and conservative in spirit. Of his numerous writings we may mention *Staats- und Rechtsgeschichte der Stadt und Landschaft Zürich* (Zür. 1838, 1839; new ed. 1856); *Geschichte des Schweizer Bundesrechts* (Zür. 1846-52); *Allgemeines Staatsrecht* (Mün. 1852; 4th ed. 1869); *Deutsches Privatrecht* (Mün. 1853; 3d ed. 1864); *Die neuen Rechtsschulen der Juristen* (2d ed. Zür. 1862); *Geschichte des Allgemeinen Staatsrechts und der Politik* (Mün. 1864); *Das Moderne Kriegerrecht* (1866); *Das Moderne Völkerrecht als Rechtsbuch* (1868).

Boa, a name applied generally to the serpents included in the family *Boide*, which includes the true Boas and Pythons (q. v.). These serpents are the giants of the serpent tribe, and are included in the sub-order *Colubrina*, and in the *Innocuous* section of that group. These forms possess ordinary teeth in the upper jaw, and are destitute of fangs and a poison-apparatus; but, although innocuous as far as venomous qualities are concerned, they are yet greatly to be dreaded on account of their immense strength, by means of which they are enabled literally to crush their victims to shapeless masses, by entwining themselves round their bodies, and inclosing the victim within the folds. Rudimentary hind-limbs exist, these being indicated externally, by the presence of two horny claws or spurs, placed in close proximity to the vent. The tail is eminently prehensile, and is covered below by a double row of plates. By its aid these forms suspend themselves from trees, whilst they lie in wait for their prey. The head is covered by scuta, or shields, is roughly triangular in shape, and is separated from the body by a neck-like constriction. The mouth is very wide, the gape extending far behind the eyes. The throat is scaly, and the belly is covered by transverse plates. No intermaxillary teeth exist in the boas, and the teeth are conical and somewhat recurved in form. These serpents occur chiefly in S. America. The *B. constrictor* is the best known, but by no means the largest species. It generally attains a length of 12 or 15 feet. The *B.*, or *Eunectes marinus*, or 'Anaconda' of some writers, is larger than the *B. constrictor*—this latter term, like the name *B.* itself, being applied indiscriminately, and in a popular sense to all the members of the group.

These forms are credited with being able to swallow prey of very large bulk; and there can be no doubt that a large *B.* can swallow animals of the size of a sheep or goat. Various circumstances contribute to the easy deglutition of prey of such bulk. Thus, firstly, the body of the victim is crushed to a shapeless pliant mass by the folds of the serpent. Its body is probably smeared over by the viscid or glutinous saliva of the *B.*, and is thus more readily swallowed. The mouth of these serpents can be greatly distended from side to side; the halves of the lower jaw being connected by ligament only, and the mouth-cavity can also be greatly widened in a vertical direction, owing to the mode in which the lower jaw is articulated to the skull. Then, lastly, the teeth, from their recurved position, assist in retaining the prey in the mouth as it is being slowly swallowed. After a full meal, these forms generally lie torpid for a longer or shorter period. As in many other serpents, only one lung is functionally useful in the boas, the other lung being abortive or rudimentary. These serpents generally inhabit the neighbourhood of rivers and lakes, and lie concealed amid the branches of trees, so as to pounce with certainty upon the animals which come to drink. The nearly related Pythons (q. v.) of the Old World very closely resemble the boas in their essential characters, but possess intermaxillary teeth, and their labial or lip-plates are deeply pitted.

Boadicea, 'the British warrior queen,' ruled over the Icenii, in the district now known as Norfolk and Suffolk, in the latter half of the 1st c. A.D. Her husband, Prasutagus, to win the favour of the Romans, had left (60 or 61 A.D.) his wife and two daughters and the Emperor Nero his joint-heirs. The bribe proved of no avail, for the Roman soldiers plundered the country, scourged B., and violated her daughters. The Britons rose, and in revenge took several colonies and destroyed about 70,000 Romans. Suetonius, the Roman governor, now advanced, and



Boa Constrictor.

was met by B. at the head of a great horde of her infuriated countrymen. A terrific battle ensued, in which the Britons were completely overwhelmed, and the Roman power in Britain firmly established. Tacitus tells us that some writers state the number slain amounted to 80,000. B., in despair, took poison and died (62 A.D.).

Board, the name usually applied to the directors and others having the management of any public institution, or of any legal, commercial, or charitable trust. In various departments of the government, the term is also used to denote those in management, when met for business purposes.

Board, a plank or deal of timber, as used in most operations of joinery. From the use of such timber in vessels B. has come to have a special application in nautical affairs. Aboard or on board ship are phrases used in connection with the loading of ships' cargoes or the reception of crews or passengers. Boarding an enemy is a phrase in the tactics of naval warfare which was formerly much practised, but in the transition state of vessels and armaments it is difficult to say what may be the future course of sea-fights. 'On the boards' is an expression having originally a theatrical application, meaning the bringing forward of anything on the stage; but it has now passed into current language to indicate the production of any project or display.

Board of Admiralty is a department of government which has the control of all matters relating to the British navy. In former times the functions of the B. of A. were discharged by the Lord High Admiral of England. See ADMIRAL.

The board is composed of five Lords Commissioners. Two of these are civilians, and three are naval officers. Besides his share of corporate action, each lord has his special function. The First Lord is always a cabinet minister. At board meetings he has, like the rest, but one vote; but his parliamentary responsibility as a member of the Government practically invests him with absolute authority.

Board of Ordnance was a department of the government having control of all that related to the artillery and munitions of the British army. It was found that in matters relating to coast defences there was some conflict between the jurisdiction of the B. of O. and that of the Admiralty; and the earlier events of the Crimean war showed in other respects a want of working harmony between it and some other government departments. These facts led to the dissolution of the B. of O.

The surveyor-general of the Ordnance is now an officer in the department of the Secretary of State for War. The surveyor-general is responsible for the munitions of the army.

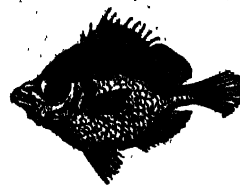
Board of Trade is a department of the government having very wide and important functions respecting the trade and navigation of the United Kingdom. It has a general superintendence over the mercantile marine. It exercises considerable control over marine boards. It appoints officers to inquire into and report on the condition of trading vessels. The board is chiefly composed of a president and secretary, with three assistant secretaries and four inspectors. Perhaps the most important function of the B. of T. is now the supervision of railways and railway companies. Notices of application for railway acts with plans, must be deposited with the board before the relative bill can be brought before Parliament. Before a railway is opened for traffic, the permission of the board on the report of an inspector, must be got. On the occurrence of an accident, notice must be given to the board, which is then empowered to take any measures which it may consider advisable for public safety.

The B. of T. prepares and publishes at monthly and other periodical intervals, accounts showing the exports and imports of the United Kingdom for the period, with relative matter, so as to show the commercial position and progress of the country. It also prepares selections from the commercial statistics of foreign countries.

All applications made to the sovereign for charters of incorporation are referred to the B. of T.

Boar-Fish (*Cephus asper*), a fish belonging to the *Scombridae* or Mackerel family, possessing a short, deep, oval body, greatly compressed and covered with scales. Two dorsal fins exist closely situated together; but no elongated filaments or

spines along the base of the dorsal and anal fins exist in the B. F., as in the nearly allied *Dory* (*Zeus faber*). The eyes are of large size, and the jaws project to form a snout. The body is coloured red, and banded with orange bands across the back. This fish inhabits the Mediterranean Sea, and is rare on the southern English coast.



Boar-Fish.

Boast (Fr. *baucher*, to rough-hew), is, in sculpture, a term applied to the blocking out of a piece of stone or wood into rude outlines of the figure to be afterwards finished.

Boat, a small vessel adapted for navigating water, and propelled by means of oars, sails, or steam. The earliest kind of B. was formed of wicker-work: coated inside and outside with bitumen, or covered with skins. The Egyptians and other ancient nations used boats of this description, and a similar B. was known among the ancient Britons, and is still in use on the Welsh and Irish coasts. (See CORACLE.) There are very many varieties of boats in form and construction, designed to serve different purposes; for instance, boats for swiftness are slim, and have fine lines; those for carrying burdens are of a strong construction; for shallow water they are flat-bottomed; and so forth. Boats form a very necessary adjunct to a ship, and accordingly ships-of-war are equipped with a number of boats, including *longboats*, *barges*, *pinnaces*, *cutters*, *gigs*, *yawls* and *jolly boats*, each kind having its special uses. Heavy built steam launchers, adapted for carrying a gun, are also attached to men-of-war. A *wherry* is a light, sharp B., used for transporting passengers or goods on a river, and sometimes employed in B.-racing (see BOATING). A *punt* is a small flat-bottomed vessel; a *skiff*, a small light B. for river-sailing. The principal parts of a B. of ordinary form are—the *bow*, the *stern*, and the *midships*. The bow is the head of the vessel placed behind the *stem*, or *cutwater*, the opposite end is the stern, and the intervening space is the *midships*. At the stern is the *stern-post*, to which the *rudder* is fixed for steering. The side boards of a B. are called *strakes*, the lower of which are termed *garboards*, and beneath these is the *keel*, the principal timber on which the whole frame rests. The *bow sheels* are the timbers at the bottom of the B. at the bow, and the corresponding parts at the stern are the *stern sheels*. The seats placed athwart the B. are called *thwarts*, and on the upper edge or *wale* of the B. are placed the *rowlocks*, projecting pieces of wood or iron, between which the oars or sculls rest. See LIFEBOAT.

Boat-bill (*Cancroma cochlearia*), a genus of gallatorial or wading birds, belonging to the family *Ardeida* or herons, and found in S. America. The bill resembles in shape a boat with the keel uppermost, whilst it has also been compared to the bowls of two spoons placed with their concavities together. The upper mandible terminates in a strong hooked process. The legs are shorter than in the generality of wading birds, and this bird is believed to perch on trees situated by the sides of rivers, and to dart down upon fishes. The French colonists of Guiana term the B. *Crabier* from their belief that it subsists on crabs, and from this supposition the generic name *Cancroma* is also derived.

Boat-Fly (*Notonecta*), a genus of insects belonging to the *Hemiptera* or bugs, and included among the *Hydrocoris* or aquatic members of the group. The group *Notonectida* includes those distinguished by the broad rounded form of the head. The legs are adapted for swimming, and these forms both swim and rest in the water on their backs. They inhabit fresh-water pools, and, like other *Hemiptera*, possess a powerful *rostrum* or 'beak,' by means of which they can inflict severe wounds. The air required for breathing is contained within a cavity placed between the wings and the back. *N. glauca*, or the 'water-boatman,' is the familiar species. These insects are carnivorous in tastes, and feed on other insects. The common species is about $\frac{1}{2}$ an inch in length.

Boat'ing, the art of propelling a boat by means of sails (see YACHTING) or by oars, called *rowing*, which method is treated of in this article. Rowing is a useful art and forms a healthy physical exercise. Of late years its cultivation has immensely

increased in British waters. There are now innumerable rowing clubs, of which the principal are those of the Thames, Tyne, Mersey, and Clyde. *Gigs*, *outriggers*, and *outriggered gigs* are the chief varieties of boats used in rowing on rivers; wherries and skiffs are also sometimes employed by watermen and amateur rowers. (See BOAT.) Gigs are found of all sizes suitable for from 6 to 8 oars; when there are three seats the boat is called a *rândan* gig, in which the centre rower plies a pair of sculls, and the other two rowers a single oar each. A *scull* is a light and short form of oar, a pair of which can be worked easily by one person in the operation of *sculling*. Outriggers are used for racing purposes, and are propelled by a single sculler. They are much lighter and narrower than a gig, being usually 30 feet in length with a breadth amidships of a little over one foot, tapering off to mere points at the ends. Amidships is placed the 'box' in which the sculler sits, and the leverage necessary to propel the boat is gained by mounting the rowlocks at the end of an iron support rigged outside of the box—this arrangement giving the boat its name. Outriggered gigs, or *wager-boats*, are constructed like a gig, with outriggered iron rowlocks, and carry from 2 to 8 oars according to size. Most of the universities of Great Britain have B. clubs, and upon the Cam and Isis, specially, rowing is zealously practised. The 8-oared match between the representatives of Oxford and Cambridge, which takes place annually at Easter on the Thames between Putney and Mortlake, is an event that always awakens public interest. From 1829 (the year of the first contest between the rival university crews) to 1875, 32 matches have been rowed, of which Oxford has won 17 and Cambridge 15. The length of the racing-course is about 4½ miles, and the shortest time occupied by either of the representative crews was in the match of 1873, when Cambridge performed the distance in 19 minutes 35 seconds. On 27th August 1869, a 4-oared match between the representatives of Harvard College, Massachusetts, and those of Oxford, took place on the Thames course, Oxford winning, after a gallant contest, in 22 minutes 20 seconds. A decisive victory was also gained on 10th June 1872 by the London Rowing Club over the Atalanta Boat Club of New York in an international 4-oared match over the Thames course; the English crew on this occasion conformed to the American practice of rowing without a coxswain, one of the oarsmen steering the boat by means of an apparatus managed with his feet. By far the greatest innovation, however, of late years, was the introduction of sliding seats in 1871, an invention now everywhere admitted to be the means of a great increase of speed. Among other interesting boat-races may be mentioned the annual one on the Thames between young watermen for Dogget's coat and badge, a prize given in 1715 by an eminent actor of that name, who left a sum of money at his death for the yearly continuance of the match on the 1st of August, the anniversary of the accession of George I. See W. B. Woodgate's *Oars and Sculls* (Lond. 1875).

Boat-lowering Apparatus, an arrangement usually consisting of pulley-blocks and ropes, or other gearing, whereby boats may be lowered from a ship in perfect safety when the vessel is in motion. It is a matter of the utmost importance, in the event of any emergency at sea, that the boats of a ship should be available for lowering without fear of mishap, whether the sea be smooth or rolling. Until of late years it was a common misfortune, from the clumsy construction of the ships' davits, and the unworkableness of the accompanying gearing, in lowering the boat, that one 'fall' was released while the other could not be disengaged, and the boat was swamped in consequence of being lowered perpendicularly. It often happened, too, that the boat was bilged against the ship's side in process of lowering. The risk attending the lowering of boats at sea is now, however, greatly diminished by the adoption of one or other of many recent inventions of E. A. Clifford's method has probably been adopted more than any other system, and is in use in many vessels of the British navy. His apparatus was patented in 1856, and consists of a rope passing from each davit-head through peculiar blocks in the ends of the boat; thence they are coiled upon a barrel or roller placed under one of the seats in the centre of the boat, the ends of each rope being firmly secured to the roller by a special contrivance, till the boat is launched, when they are set free. To the roller is attached a third rope, which controls the unwinding of the other two in the descent of the

boat, and this regulating rope is held by a man in the boat. Dr Nicholson, of the royal navy, has recently made the following invention the subject of a patent: A 'cradle' is attached to and suspended from the upper end of a frame, consisting of two long vertical arms, strengthened by transverse bars and hinged at their lower ends to the ship's side at a suitable distance from the water's edge, the whole apparatus being made of iron. The cradle carries the boat, and, to lower it, with the crew already seated, it is only necessary, by means of lowering tackle and blocks, managed either from the boat or the ship's deck, to ease off the upper ends of the frame, which describe an arc of a circle in passing to the water, on reaching which the boat is disengaged by the cradle passing under the water in consequence of the momentum acquired in its descent. Mr Hill has also invented an apparatus which has been tried with success in the British navy. It consists mainly of two disengaging hooks of peculiar form, which are fixed to ordinary chain slings at each end of the boat; and with these hooks the rings attached to the lower tackle-blocks are locked by means of a small piece working on a pivot. So long as there is any strain upon the rings, they cannot be detached from the hooks; but, on the strain ceasing by the floating of the boat, the rings slide off the hooks. To prevent one fall disengaging without the other by the boat being water-borne at one end by a wave, the two rings are connected by a 'life-line' stretching between them, thus distributing the strain, and only allowing the rings to be unlocked when the boat is completely water-borne and the falls at both ends slackened.

Boat'swain, the second of the three warrant officers on board Her Majesty's ships. He has charge of the boats, rigging, anchors, and cables. It is his duty to turn the hands up to relieve at the watches, and, if necessary, to summon the whole crew. The *B.'s mate* assists him, summons the watches or other portions of the crew, and inflicts the flogging—a punishment to which British seamen are still liable.

Boat-Tails, a name applied to the Inessorial birds forming the family *Quiscalina*, represented by American birds allied to the starlings. Of these birds the *Quiscalus ferrugineus*, and the *Q. versicolor*, or 'Crow Blackbird,' are good examples. The tail is long and tapering, and the edges are curved upwards like the sides of a boat, this conformation suggesting the above familiar name. *Q. versicolor* is about 12 inches in length, and is coloured entirely black, with metallic tints and lustres. These birds feed on insects, but they also damage the crops of Indian corn.

Bobb'in, a wooden implement upon which thread of any kind is wound for use. The best bobbins are made from birch, but the scarcity of that kind of wood causes other hard woods to be frequently employed. Bobbins are of three kinds—1st. Those employed in the spinning of yarns; 2d. Weavers' bobbins; and 3d. The bobbins or reels used for sewing thread. The bobbins used in spinning have large flanges, and are usually of three sizes; a large size being employed for holding 'slubbings'; a medium size containing the somewhat more compressed and drawn out 'rovings'; and a small size, on which is wound the spun yarn. Weavers' bobbins, which have only a flange at their upper extremity, also vary according to the size of the shuttle used, which is regulated by the fineness of the material to be woven. In the manufacture of thread bobbins or reels, ingenious automatic turning machinery is employed, which produces the reels with great accuracy and rapidity.

Bobb'in Net, a kind of network made in the lace manufacture, in which the threads are twisted round each other, so as to form an open reticulated texture. It was originally made by hand-work on a pillow with pins and bobbins, but in 1808 Mr John Heathcot invented the first effective B. N. machine, and net-work is now made by very intricate and ingenious machinery. See LACE.

Bobb'io, an ancient ecclesiastical town of N. Italy, province of Pavia, on the Trebbia, 30 miles S.E. of the city of Pavia. It is the see of a bishop, and has a trade in wheat, Indian corn, wine, and fruit. B. was almost destroyed by an inundation of the Pellice in the time of Oliver Cromwell, who gave a grant of money for the building of a protecting wall. Pop. 4575.

Bo'bia, called also Pirate Isle, an island in the Bay of Amboise, on the coast of Guinea, Africa. It is said to be densely

peopled, but its shores are steep and difficult of access, and it is slowly diminishing in size, owing partly to its gradual subsidence, and to the action of the sea.

Bob o' Link Reed Bird, or Rice Bird (*Dolichonyx oryzivorus*), a bird included in the Conirostral section of the Insectorial order, and allied to the *Fringillina* or finches. It occurs in the winter in the W. Indies, but migrates northwards in summer to lat. 54°, and is chiefly found at the latter season in the eastern parts of N. America. The tail feathers are pointed and of stiff conformation. It averages a yellowhammer in size; the males exhibiting a brilliant plumage in spring and summer; the plumage being black, the hinder part of the head yellowish white; and the rump and tail-coverts white, tinged with ash. The food of these birds consists of insects, worms, and seeds, and in autumn of the seeds of oats and barley. The song consists of a medley of notes. They grow fat in August particularly on the wild rice which grows along the shores of the rivers in Carolina, New-York, and Pennsylvania. Their flesh is then much esteemed, and they are shot in large numbers. The males in winter assume the more sombre plumage of the females. These birds are kept in cages chiefly for their gay appearance, and on account of their song.

Bobrinez, a town of Russia, government of Cherson, 132 miles E.N.E. of Odessa. Pop. above 10,000.

Bobrujak, a town of W. Russia, government of Minsk, on the right bank of the Beresina, 88 miles S.E. of Minsk. It carries on an important trade in wood and corn. Pop. (1867) 24,681, among whom are upwards of 11,000 Jews. B. was besieged by the French without success in 1812. By the Emperor Nicholas it was made a fortress of the first rank.

Bobstays, the stays or strong ropes which keep down the bowsprit during the plunging of the ship, and also sustain the other stays which keep the foremast, fore-topmast, &c., and therefore the main-topmast, from falling aft. B. are frequently made of chains.

Boca, the Spanish word for 'mouth,' is used geographically in Spanish America to denote the outlets of straits and rivers, as *B. Chica* ('little-mouth'), the entrance into the harbour of Cartagena, in S. America; *B. del Drago* ('dragon's-mouth'), the strait leading from the N. into the Gulf of Paria, between the Island of Trinidad and the mainland. There are also *B. del Navio* ('entrance for ships'), the estuary of the Orinoco river; *B. Grande* ('the great entrance'), at the mouth of the Zucar river in Costa Rica; *B. del Toro* ('bull-mouth'); and *B. del Tigre* ('tiger-mouth'), in the S.W. angle of Costa Rica.

Bocca Tigris, or **Bogue**, is the Portuguese name given by Europeans to the entrance of the Canton River in China. Among the Chinese themselves it is known as *Hu-mén*, or in the Canton dialect *Fu-mén* (i.e., 'Tiger-port').

Boccaccio, Giovanni, who may be regarded as the creator of Italian prose, was the son of a Florentine merchant, and born at Paris or Florence, it is uncertain which, in 1313. When ten years old he was apprenticed by his father to a merchant at Paris; but mercantile pursuits and the study of the canon law, to which he afterwards applied himself, were equally distasteful, and as soon as he was his own master, he devoted himself entirely to literature and study. He commenced his career as an author by publishing at Naples in 1341 *Il Filicopo*, a prose romance of no great merit, inspired by his passion for an illegitimate daughter of King Robert. This was followed by *La Teseide*, a romantic epic in *ottava rima*, a measure of which B. is believed to have been the inventor. The *Knights Tale* of Chaucer was probably suggested by this poem. His fame was established on an imperishable basis by the composition of the *Decamerone*, begun, it is said, at the request of Queen Joanna, and finished about 1358. It consists of 100 tales, represented to have been related in equal portions in *ten days* (hence the name) by a party of seven ladies and three gentlemen, who had retired from Florence to a villa in the neighbouring hamlet of Fiesole, during the destructive plague of 1348, to dispel their fears for a season by an episode of uninterrupted and unreflecting gaiety. The incidents are partly the invention of the author, but partly derived from earlier *Contes* and *Fabliaux*, and even from fables found in Greek

authors. Many of the tales are licentious in the extreme, and were the cause of deep regret to B. in after years; others, however, are informed with the finest morality, and breathe the deepest pathos, while they have furnished themes for the muse of Chaucer, of Shakspeare, of Dryden, and of Keats. The style is beyond all praise—exquisitely symmetrical and polished—and the narrative is full of grace and liveliness. Soon after he had finished the *Decamerone*, B. applied himself to the study of Greek, was a collector of manuscripts of the classical authors, and became one of the most learned men of his age. These pursuits brought him into contact with Petrarch (1350), and thenceforth, till severed by death, these distinguished geniuses were the firmest friends. B. is the author of several works in Latin prose, now little read, among which are his *Genealogia Deorum*, *De Mulieribus Claris*, &c. His death, which occurred at Certaldo, 21st December 1375, is said to have been hastened by his zeal in preparing his *Commento Sopra la Commedia di Dante*, having been appointed by the magistrates of Florence to give public lectures on the *Divina Commedia* of the great poet. A complete edition (*Opere Complete*) of his works was published by Moutier at Florence in 1827, in 17 vols. Of the *Decamerone*, which has been translated into almost every European tongue, the *editio princeps* was published at Venice in 1471; of the modern editions, Biagoli (1833), Foscolo (1825), and Fanfani (1857), the last is the best. See the biographies of Manetti, Manni, Mazzuchelli, Tiraboschi, and Baldelli (Flor. 1806); also Ciampi's *Monumenti d'un Manoscritto autografo di Giovanni B.* (Flor. 1827); but the most recent and the best work is Dr. M. Landau's *Giovanni Boccaccio: sein Leben und seine Werke* (Stuttgart, 1877). See also *Le Lettres édité e inédite di Messer Giovanni Boccaccio, tradotti e commentate da Francesco Corazzini* (Firenze 1877).

Boccage, Marie Anne Du, a French writer, much admired by Voltaire, Fontenelle, and others, was born at Rouen, October 22, 1710, and became the wife of a wealthy financier. Her writings comprise a translation of Pope's *Temple of Fame* (1746); an imitation of Milton in her *Paradis Perdu*, and *La Mort d'Abel* (1748); an epic poem, called *La Columbiade* (1749); and a tragedy, *Les Amazons*, produced at the Comédie Française. Her poems were translated into English, Spanish, German, and Italian. She has long ceased to be read. The *Lettres* (1751) descriptive of her travels in England, Holland, and Italy, were translated into English. She died 8th August 1802.

Bochart, Samuel, a French protestant theologian, born at Rouen, May 30, 1599. After having given proof of extraordinary philological aptitude during his studies at Paris, Sedan, Saumur, and Leyden, he became, in 1625, Protestant pastor at Caen, where, in 1628, he disputed for nine days with the Jesuit Vérin, a protégé of Richelieu, and published an account of the discussion in 1630. His *Geographia Sacra* (Caen 1646), a favourite with Humboldt, embodied the results of twenty years' special study; his *Hierozoicon*, or *Sacred Zoology* (Lond. 1663), greatly commended by Cuvier, owed much of its value to information found in some Arabic manuscripts lent to B. by Queen Christina of Sweden, whom he had visited in 1652. This work, impugned by Simon, was defended by J. Leclerc; and an edition, in 3 vols. 4to, with notes by E. J. C. Rosenmüller, was published at Leipzig (1793-1799). B. died at Caen, 16th May 1667.

Bochart, a town of Austrian Galicia, situated 23 miles E. by S. of Cracow. There are extensive mines in the neighbourhood, yielding gypsum, zinc, and rock-salt—the last forming by far the most important product, as much as 15,000 tons being raised annually. Pop. of town (1869) 7480.

Bocholt, or Bochold, a town of Prussia, province of Westphalia, on the Aa, 12 miles N. of Wesel, on the Rhine. It has a fine Catholic church, a synagogue, an hospital and orphanage, some twenty cotton-mills, ten dye-works, and also manufactures of woollens, silks, hosiery, and ironwares. It is the chief town of the barony of B. and Anholt, which belongs to the Princes of Salm-Salm, who have here a castle. Pop. (1872) 6127.

Bochum, a town of Prussia, province of Westphalia, 5 miles E.N.E. of Essen by railway. It has large manufactures of cloths, iron and steel wares (notably coffee-mills), tobacco, and tapestry. There is a chamber of commerce, a royal technical school, a municipal high school, and various other public institutions. Pop. (1872) 21,192.

Book'au, a town in the circle of Zwickau, Saxony, 25 miles S.S.W. of Chemnitz, in the Erzgebirge, famous as a centre for the gathering of many valuable medicinal herbs. It has some manufacture of drugs and tinctures. Pop. (1871) 1860.

Book'enheim, a town of Prussia, province of Hesse-Nassau, and a station on the Main and Weser Railway, about a mile N.W. of Frankfurt-on-the-Main, of which it is virtually a suburb. It has manufactures of culinary articles, pianos, cigars, spirits, fancy wares, and bijouterie. Pop. (1872) 8483.

Böckh, August, one of the most learned philologists and ingenious antiquaries of this century, was born at Karlsruhe, November 27, 1785. He entered the university of Halle in 1803, and studied under Wolf. After being engaged for a short time as professor at Heidelberg, B. was appointed in 1811, Professor of Rhetoric and Ancient Literature at Berlin, a post which he held with distinguished honour for over half a century. He died August 3, 1867. B. began his career as an author by his first publication, *Commentatio in Platonis qui vulgo fertur Minocem* (Halle, 1806). Two years later appeared his *Græce Tragædiæ Principum, Æschyli, Sophoclis, Euripidis nunc ea quæ supersunt et gemina omnia sint*. His *Pindar* (3 vols. Leips. 1811-22) is a great work of classical criticism. Other writings of B.'s which hold the first rank among works of the kind are *Die Staatshaushaltung der Athener* (1817, 2 vols. 8vo), *Die Entwicklung der Lehren des Pythagoræen Philolaos* (Berl. 1819), *Metrolologische Untersuchungen über Gewichte, Münzfusse, und Masse des Alterthums* (Berl. 1838), *Urkunden über das Seewesen des Attischen Staats* (Berl. 1840). Along with these labours must be noticed his collection and elucidation of Greek inscriptions in the *Corpus Inscriptionum Græcarum* (Berl. 1824-62), which he began with the intention of giving in it every Greek inscription known in print or manuscript. After his withdrawal from the undertaking, it was carried on first by Franz, and afterwards by Kirchhoff. His minor writings have been collected and published (*Gesammelte kleinere Schriften*, 5 vols. Berl. 1858-71).

Bocland, or **Bookland**, one of the original modes of the tenure of manor-land. It was constituted by a short deed stipulating for rents and free services. It was sometimes granted for one or more lives, with remainder in perpetuity to the Church. See *Kerr's Blackstone* and *Wharton's Law Dictionary*.

Bode, Barons de, a family well known in England through a claim made on account of an estate in Lower Alsace confiscated in 1793, for a share of the sum granted by France as indemnity to the English sufferers by the Revolution. The claim was repeatedly discussed in Parliament, and was finally dismissed on the ground that at the time the estate was lost the then baron was not an English subject. See J. Hodgkin, *Case of the Baron de B. in its Present Aspect* (1860).

Bo'den-See. See **CONSTANCE, LAKE**.

Bode's Law is an empirical law in astronomy, connecting the distances of the planets from the sun, and may be thus stated. Reckoning from the orbit of Mercury, and supposing the distance of Venus to be 3, that of the earth is 6, that of Mars 12, that of the Asteroids 24, &c. Hence, taking the distance of Mercury from the sun as 4, we have the following numbers representing the distances of the planets, the true distances being placed below for comparison:

Mercury	Venus	Earth	Mars	Asteroids	Jupiter	Saturn	Uranus	Neptune
4	7	10	16	28	52	100	196	388
3.9	7.2	10	15	27.5	52	95	192	300

Neptune is the only one which falls short to any considerable extent. Similar laws are found to hold for the several systems of satellites.

Bod'kin (etymology uncertain), originally a poniard or dagger, in which sense it is used by Shakespeare in Hamlet's famous soliloquy (Act 3, sc. 1), 'When he himself might his quietus make with a bare bodkin.' The word also denotes an instrument for piercing holes in cloth, a large species of needle for drawing tape or ribbon through a loop, and a straight hair-pin which was used in ancient times, and still turns up in the changes of fashion.

Bodley, Sir Thomas, born of an ancient family at Exeter, 2d March 1544. His father going to Geneva during the perse-

cutions of Mary, B. had an opportunity of attending the lectures of Calvin and Beza. After becoming a graduate and proctor at Oxford, he travelled on the Continent to learn the languages, and was subsequently employed by Queen Elizabeth in several important diplomatic missions connected with the Protestant cause, especially in France and Holland. B. says his further political career was stopped by the disputes of Essex and the Cecils. He then (1597) devoted himself to the library at Oxford which bears his name, giving books worth £10,000, endowing the officers of the library, and helping the construction of the new house. B. died at Oxford, 28th January 1612. See his *Autobiography in Reliquiæ Bodleianæ* (published by Hearne in 1703).

Bodley'an, or **Bodleian Library**, the public library of the University of Oxford, was originally founded by Humphrey of Gloucester, almost entirely destroyed by the visitors of Edward VI., but re-established and endowed by Sir Thomas Bodley about 1602. Bodley drew up statutes which prohibit lending of books. The visitors and curators now consist of the vice-chancellor, proctors, regius professors of divinity, civil law, medicine, Greek and Hebrew, and five residents elected for ten years by Congregation. The present librarian is Mr B. O. Cox, with a salary of £1000, and two assistants. The library is free to literary men on proper recommendation; members of the university are admitted on payment of a small sum annually. The library is supported by voluntary contributions, the endowment (increased this c. by the Mason bequest of £40,000), the charge on matriculation (introduced by Lord Stowell in 1780), and the statutory right to a copy of every book published in the United Kingdom. This right originated in an agreement between Sir T. Bodley and the Company of Stationers in 1609, which was enforced by a decree of the Star Chamber, and ultimately recognised in the form of a condition of the printing licence in the Sedition Act, 14 Charles II. c. 33. Among the valuable collections may be mentioned Lord Pembroke's Greek MSS., collected by Barozzi; Sir T. Roe's Oriental and Greek MSS.; Dodsworth's collections on English History; the MSS. of Archbishop Sharpe; Selden's Library (containing many Talmudical and Rabbinical treasures); the Hebrew Library of Oppenheim; Malone's poetical collections, presented by Lord Sanderlin; Gough's collection on British Topography, and Douce's Library. The library has a number of Biblical codices. The books number about 300,000, the MSS. between 20,000 and 30,000.

Bod'mann (anc. *Bodami Castrum*), a village in Baden, on Lake Constance, 12 miles N.W. of Constance. Pop. (1872) 891. Close by stand the ruins of a castle, formerly the residence of the lieutenant of the Karoling kings, the *Botemann* or *Bodmanno*, from whom the lake takes its German name of *Boden-See*.

Bod'mer, Johann Jakob, a German *literateur*, and for fifty years Professor of History at Zurich, was born 19th July 1698 at Greifensee, near Zurich. An intimate acquaintance with foreign literature showed him how tasteless that of Germany had become, and he set himself to reform it with more zeal than ability. The boldness of his attempt provoked the ire of Gottsched, and their fierce disputes did something to pave the way for the splendid epoch that commenced about 1770. B. died 2d January 1783. His poems, dramas, and translations never rise above mediocrity; but his republication of a part of the *Nibelungen* (Zur. 1757), and his *Sammlung der Minnesänger* (2 vols. Zur. 1758), acted on the current poetic literature of Germany somewhat as the publication of *Percy's Reliques* acted on that of Britain. His *Noachide* (Zur. 1750-52; new ed. Basel, 1781) is the most widely known of his works. See Danzel's *Gottsched und seine Zeit* (Leips. 1848), and Mörikofer's *Die Schweiz-Literatur des 18 Jahrh.* (Leips. 1861).

Bod'min, the county town of Cornwall, lies in a picturesque valley near the centre of the county, 26 miles N.N.W. of Plymouth, with some manufacture of woollen and yarn, and a trade in cattle and sheep. It is connected by a branch railway with Wadebridge, its port, 7 miles to the N.W., and it is 7 miles distant from the B.-road station on the Cornwall line. The chief buildings are a church of the 15th c., the market-house, county jail, built in 1859 at a cost of £40,000, and the Cornwall Lunatic Asylum, built in 1866. B. returns one member to Parliament. Pop. (1871) 6758. B. is an old town, which grew up around a priory said to have been founded by King Ethelstan in 936, and at one time had a cathedral, and was a place of im-

portance. Thomas Sternhold, joint author with Hopkins of the first English metrical version of the Psalms, was once the proprietor of B. Priory. The town declined in the 16th c., but has regained much of its importance.

Bodonì, Giambattista, a distinguished Italian printer and type-cutter, was born at Saluzzo, Sardinia, February 16, 1740. In 1758 he went to Rome, where he remained six or eight years as compositor in the printing-office of the *Propaganda*. In 1768 he removed to Parma, and became in 1789 the superintendent of the Duke of Parma's private printing establishment. From this press he sent out his editions of the *Iliad*, *Virgil*, and several other classical works, and also the Lord's Prayer done in 155 languages, all of which are admirable for their beauty of type. B. died at Parma, November 20, 1813.

Body, Human, will be described in detail under the various organs, tissues, and functions of the body, as Arm, Bone, Brain, Cerebellum, Leg, Liver, Lung, Muscle, Nerve, Spleen, the organs of Sense, Connecting Tissue, Circulation, Digestion, Perspiration, Respiration, &c. For a general description of the progress and present state of human anatomy, see ANATOMY, HISTORY OF; also article MAN.

Body-snatching. See RESURRECTIONIST and ANATOMY (in Law).

Boece (Boyce), Hector, was born at Dundee about 1465, educated at Aberdeen, and afterwards at Paris, where he gained the friendship of Erasmus, and was made Professor of Philosophy in 1497. In 1500 he was appointed Principal of the newly-founded College of Aberdeen, where he did much to promote learning in Scotland. In 1522 he published at Paris his *Lives of the Bishops of Mortlach and Aberdeen*, and in 1526 his *Scotorum Historia* in seventeen books. Like Geoffrey of Monmouth, he pretended to have derived his history from imaginary authorities, declaring it to be based on the writings of two putative authors, Veremundus and Cambell. The work is less sober than the Chronicles of Fordun and Wyntoun, and abounds in romantic fable; but his narrative seems, says Mr Burton, 'to have been skilfully adjusted to the conditions of belief in his own time.' Shortly after publishing the history, B. received from James V. a pension of £50 Scots yearly, and was likewise presented with the rectory of Fyvie, in Aberdeenshire, before his death in 1536, in which year John Bellenden produced a translation of his history. See Irving's *Literary Scotchmen of the Last Four Centuries*.

Boehmeria, a genus of plants of natural order *Urticaceæ*, much esteemed for their fibres. *B. nivea* yields the fibres out of which the Chinese Grass Cloth (q. v.) and other articles are made. It is extensively cultivated by the Chinese under the name of Tschou Ma, and having been introduced into Siam, Burmah, Assam, and other semi-tropical countries, it is likely to prove a valuable article of commerce, its fibre being now highly appreciated in Europe. It is also known by the Sumatran name of *Caloe*, the Malayan one of *Ramee*, under which name it is cultivated in the United States (*Rep. Dep. of Agriculture*, 1873, p. 261), but more frequently by that applied to it in Assam, viz., *Rheem*. *B. candicans*, *B. utilis*, *B. Fuya*, *B. caudata*, and other species of the genus, yield similar fibres of greater or less value and fineness. Forbes, *Journal of the Society of Arts*, 1875, p. 521.

Boeotia, a political division of ancient Greece, bounded S. by Attica and Megaris, W. by the Gulf of Corinth, N. and N.W. by Locris and Phocis, and E. by the Eubœan Sea, with an area of 1119 sq. miles. A mountain chain, extending E. and W., divides it into N. and S. B., the former containing Lake Copais, which would be a fertile plain had the waters of the Cephissus and its tributaries an outlet to the sea. There are several natural subterranean channels in the limestone mountains, which, it is said, the old Minyæ of Orchomenus supplemented by artificial tunnels, the greatest engineering enterprise of the pre-historic age. One of these was four miles long, and had twenty vertical shafts, with apertures 4 feet square, and a depth calculated at from 100 to 150 feet. Orchomenus consequently became great and powerful at an early period; but when the power of the Minyæ was broken, the tunnels being neglected, the plain was flooded and the city gradually dwindled. S. B. was divided by Mount Teumessus into the plain of Thebes and the valley of the Asopus. The climate of B. was supposed to be unfavourable to

mental activity; but the proverbial dulness of the inhabitants, ascribed to the denseness of the atmosphere, was due rather to greater attention being paid to physical than to intellectual development; and the poets Hesiod, Corinna, and Pindar, the historian Plutarch, and Epaminondas, one of the greatest military geniuses of Greece, were all Boeotians. B. produced heavy corn crops, and had excellent pasture grounds; the vine was cultivated with success, and the mountains yielded iron and marble. The larger cities of B., under the presidency of Thebes, formed a confederacy known as the Boeotian league, at the head of which was the archon. The affairs of the separate states were managed by military chiefs called Boeotarchs, who also discharged several executive functions. B. differed from the other Greek states in this, that it could scarcely be regarded as a truly federal state, on account of the hardly disguised sovereignty of Thebes. Attica and B. united now constitute a nomarchy of the kingdom of Greece, with an area of 2481 sq. miles, and a pop. (1870) of 136,804.

Boerhaave, Hermann, a celebrated physician, was born at Voorhout, near Leyden, 31st December 1668, and commenced the study of theology at Leyden, where he took the degree of Doctor of Philosophy in 1689. In 1690 he commenced to study medicine, reading carefully ancient and contemporary treatises on the several branches, and took the degree of Doctor of Medicine at Harderwyck in 1693. In 1701 he succeeded Drelincourt as lecturer on the theory of medicine, and at first recommended the method of Hippocrates, that, namely, of simple observation, for which, however, in 1703, he began to substitute mechanical applications and calculations bearing on the healthy equilibrium of the animal fluids. In 1709 he succeeded Hottot as Professor of Medicine and Botany, and revived the method of clinical teaching, while his services to botany were many and important. His *Institutiones Medicæ* (Leyd. 1708), and his *Aphorismi de Cognoscendis et Curandis Morbis, &c.* (Leyd. 1709), still classics are models of learning and methodical arrangement, and even Arabic translations have been made of them. In 1715 B. was made Rector of the University of Leyden; in 1718 he became Professor of Chemistry, and his *Elementa Chimiæ* (1724) is still of value as a landmark in the history of chemistry. He died September 23, 1738, leaving a fortune of two millions of florins. B. is perhaps the greatest physician of modern times; his fame filled Europe, and is said to have reached even China. He was an Associate of the Academy of Sciences at Paris, and a Fellow of the Royal Society of London. See Burton's *Account of the Life and Writings of B.* (2 vols. Lond. 1743), and also the *Biographies* of Kesteloot (1825) and of Johnson (1834).

Boerhaavia, a genus of plants of the natural order *Nyctaginaceæ* (the Marvel of Peru order), (q. v.). *B. diffusa* possesses expectorant qualities. Other species of the genus are laxative, anthelmintic, or emetic.

Boers (Ger. *Bauern*, peasants, boors), the name by which the Dutch agriculturists of the Cape of Good Hope generally are known, but which is also applied more strictly to a small band of desperadoes, mostly of Dutch extraction, who have sought refuge in the Cashan mountains, and are notorious for their rapacity and violence. See Dr Livingstone's *Travels and Researches in S. Africa* (1857).

Boëthius, properly Boetius, Anicius Manlius (Torquatus) Severinus, one of the most illustrious men of his time by his talents, his virtues, his services, and his misfortunes, was born about 470 A.D., of a noble Roman family. When Theodoric, King of the Ostrogoths, entered Rome (500), B. was appointed by the senate to address him. Theodoric was so charmed with him then and afterwards, that he made him Master of the Palace and of Offices (*magister officiorum*), in which position B. was long the oracle of Theodoric and the idol of the Ostrogoths, while he always exerted his influence for the benefit of his countrymen. Three times he was made consul, and in 510 enjoyed the unique distinction of having no colleague in that office. His two sons, while yet youths (522), were designated consuls, an honour reserved for the sons of emperors, and he himself received the greatest possible honour from people, senate, and king. But Theodoric, who became melancholy and jealous in his old age, was worked upon by creatures whose hatred B. had incurred by his opposition to their injustice and oppression. He was accused of high treason, arrested, kept in

confinement for a time, and then put to death. B. was the last Roman of any note who studied the literature of Greece. His most celebrated work, *De Consolatione Philosophiæ*, written while in prison, was translated into old English by Alfred the Great (reprinted and edited by Fox, Lond. 1864), into modern English by Chaucer and by Queen Elizabeth. It was extraordinarily popular during the middle ages, and was to be found in almost every monastic library. The oldest printed edition is that of Nürnberg (1473); the latest and best is that of Obbarius (Jena, 1843). Whether B. was a Christian or a Pagan has been keenly discussed. The Catholic Church has canonised him, and yet there is no evidence in his *De Consolatione* that he sustained himself in his last hours by the hopes of the gospel.

Bog (Gael. *bogach*, a soft, tender, moist place), another name for a moor or marsh. A B. is formed in hollows and levels by the accumulation of vegetable matter, which at one time having covered the surface as living plants, has decayed, and served to form the soil for a subsequent growth. As each generation has thus decayed, and has been replaced by a new one, the lower layers, on account of the superincumbent pressure yearly increasing, have in time consolidated to form a thick viscid mass, in some cases resembling *brown lignite*. This ultimate cohesion is doubtless aided by the chemical action of water. The British Islands afford many good examples of bogs. Ireland is specially noted in this way, B. covering as much as one-tenth part of its surface. In France, the United States, and Canada, there are also many bogs, often of vast extent. Chatmoss, in Lancaster, is a famous B., rendered so by George Stephenson's engineering triumph in carrying a line of rails across the yielding swamp. Solway Moss and B. of Allen are also well known, and continue to defy all efforts at reclamation. Perhaps one of the best instances that can be given of the transformation of a peat-B., an unhealthy and unprofitable waste, into fruitful fields, is furnished by the example of a portion of the estate of Dargavel, belonging to the late Mr Ilall Maxwell, for many years the Secretary of the Highland and Agricultural Society of Scotland. This peat-B. lay between Glasgow and Greenock, about 3 miles N. from Paisley. The moss, in its original state, was a quagmire of from 20 feet to 25 feet deep. It was saturated with water, and covered with coarse heather. Not only was it unproductive in itself, but it had an injurious influence on the crops in its vicinity. Mr Maxwell brought his agricultural knowledge to bear upon this repulsive-looking subject. He began by trenching up the sub-lying clay on the spots from whence the moss had been removed by cottars to make fuel. It was thought the money spent in reclamation would be thrown away, the land then being deemed absolutely worthless. But an expenditure of £30 an acre brought in an annual value of £2 per acre, which is not a bad percentage on outlay. And as land differs from house property, that early 6½ per cent. will inevitably increase under careful and scientific management every year, instead of deteriorating. As there are many hundreds of thousands of acres in this country at the present time equally susceptible of being changed from pestilential swamps into productive potato and corn plots, it is well to give Mr Maxwell's method. In regard to the drains—the basis of operations in improvement of this kind—it was found, after trial at shallower depths, that it was best to go down 4 or 5 feet, the distance between the drains being 20 feet. At first horse-shoe shaped tiles, floated on wooden lobs, or boards of larch, were formed, but they did not answer, and double tiles, flatter than the ordinary horse-shoe, with a broad flange instead of the usual narrow edge, which enables the one to rest securely on the other, while by 'breaking band' in the laying the pressure is divided, and the conduit is kept together. A thick sod cut from the surface to fit the bottom is placed over the tiles, with the heather downwards, and this method is found to act well in the softest of peat. The next step is to dig and level the surface to about the depth of 12 inches at first, the depth being increased as cultivation goes on. Mr Maxwell's experience taught that it was well to allow the surface to lie a considerable period after having been dug, in order that it might be acted upon by the ameliorating character of the weather. Two winters he deemed necessary. He considered that the digging should be conducted in autumn, winter being too wet for the operation, and the solar heat in summer baking the peat so as to render its disintegration difficult. After fields lie fallow for the period stated, two years' clods are broken, lime applied

at the rate of five tons per imperial acre, and the ground is ready for potatoes, which ought always on such ground to be the first crop. The drills should be formed by the spade, 30 inches apart, to admit of a flat surface, which is carefully compressed by treading after the field is covered. Twenty-five tons of best dung, and 2 cwt. of guano is a profitable manurial allowance upon such a soil. After potatoes, oats sown down with grass should be taken; clay to the extent of 100 or 120 carts per acre being mixed with the peat. The grass following upon this treatment is very good, and the satisfactory feature of this system of reclamation is that the pasture improves with age. It proves thick in the sole, and sheep prefer it to that grown upon better land. Under such management of B.-land as described, the health and material welfare of the community at large would, as a matter of course, greatly and rapidly improve.

Bogan, a river in the interior of New South Wales. It rises in Goonambla Hill in 33° S. lat. 148° 20' E. long., and flows N.W. into the Darling (q. v.) in 30° 4' S. lat. 145° 55' E. long. Its length is 450 miles, and it drains an area of 8300 square miles. During a great part of the year it is reduced to a chain of lagoons.

Bog-Butter a peculiar fatty substance found in the peat-bogs of Ireland. It is void of taste or smell, has a white colour and the consistence of butter, and is composed of 75 per cent. of carbon and 12½ per cent. each of hydrogen and oxygen. It melts at 51° C. (124° F.), and separates from an alcohol solution in needle-like crystals.

Bogdanovitch, Ippolyt Fedorovitch, a Russian poet, born 28th December 1743 at Perevolotchna. He was appointed inspector of the University of Moscow in 1761, and afterwards secretary of legation at Dresden. He published in 1775 his poem *Dushenka*, founded on the myth of Psyche; and on this, and not on his other works, which are chiefly translations, his fame must rest. Being the first of its kind in Russian literature, it may have been unduly praised, but it is sufficiently graceful and melodious to sanction the wish that he had attempted works of greater originality. He died at Kursk, 18th January 1803. A collected edition of B.'s works in 6 vols. appeared at Moscow (1809-10; 2d ed. 4 vols. 1818).

Bögen, a market-town of Lower Bavaria, near the left bank of the Danube, with some breweries, and a pop. of 1383. It is much visited by pilgrims on account of a celebrated image of the Virgin contained in its chapel on the adjoining Bogensberg.

Bögermann, Jan, a Protestant theologian, born at Oplewert, E. Friesland, in 1576, and took a prominent part in the controversies between the Calvinists and Arminians, which in his time distracted Holland. He was Professor of Divinity in the University of Franeker, and in 1618 was elected President of the Synod of Dort, where his zeal so far outran his discretion that he displeased the Frieslanders, whose delegate he was. The Dutch version of the Bible, still used in churches, and the greater portion of which is the work of B., entitles him to the gratitude of his countrymen, while his polemical works are happily forgotten. He died at Franeker, 11th September 1637.

Boghaz' Kie'ui or Koi (Turk. the 'pass village'), a village of Asia Minor, vilayet of Sivas, 90 miles S.W. of Amasia. It consists of some 150 scattered dwellings. In its vicinity are several ruins, especially of a magnificent temple, which may be that of Jupiter mentioned by Strabo (lib. xii.). Hamilton supposes B. to be the ancient *Tavium*, but Barth, after Texier, disputes this, and endeavours to show that it is probably the ancient *Pleria*.

Bog Iron Ore, a porous ore of iron of a brown colour, found abundantly in the peat-bogs of Ireland, and in marshy alluvial districts of different countries. It is the result of the decomposition of other iron ores by atmospheric or chemical agencies, and is composed of hydrated ferric oxide and phosphate of iron in variable proportions; sometimes hydrated oxide of manganese is also present. It is not wrought in the United Kingdom, but is used in North Germany, where it is considered valuable for castings. The iron obtained from it is very brittle, owing to the presence of phosphorus.

Bog-Moss. See SPHAGNUM.

Bog'nor Beds. See LONDON CLAY.

Bogodukhov, a fortified town of Russia, government of Kharkov, situated on the Merle, 31 miles W.N.W. of the city of Kharkov. Pop. (1867) 10,069, trading chiefly in cattle, hides, and leather manufactures.

Bogomil'i, a Slavonic religious sect of the 12th c., resembling the Paulicians and Kathari, and whose headquarters were in Bulgaria. The name, which is Slavonic, means, 'Lord pity us,' and has a reference to the fervency and frequency of their prayers for deliverance from the influence of the evil principle, Satanai, which created matter and man, and from whose thralldom men are delivered by the Logos, or Christ. The B. banished the sign of the cross and images from their worship, and rejected the sacraments, substituting for baptism certain repetitions of the Lord's Prayer, and regarding the Eucharist as a sacrifice to devils. Their canon consisted of the Psalms and Prophets, and the entire New Testament. Their leader, Basilus, was burned in 1118, by Alexius Comnenus. Remnants of the sect still existed at Philippopolis in the following century.

Bogong', a mountain range in the N.E. of Victoria. Several of its peaks exceed 6000 feet in height. The loftiest are Mount B. (6588 feet), and Mount Feather-top (6303 feet). The range derives its name from a large moth found in elevated regions, and highly relished as food by the blacks.

Bogon'ion, a popular name in Westmoreland and some parts of Lancashire for the royal fern, *Osmunda regalis* (q. v.). The rhizome or underground stem, when beaten and macerated in water all night, is esteemed as an application to bruises, sprains, &c. (Bentley).

Bogotá, Santa Fé de, the capital of the United States of Colombia, S. America, in the state of Cundinamarca, situated on an extensive plateau 8700 feet above the sea, near the head waters of the Meta, a branch of the Orinoco, and 290 miles S.E. of the Gulf of Darien. It was founded in 1538, is the seat of an archbishop, and contains a remarkable number of churches and convents, and, besides the Government buildings, a university, a theatre, and a national academy. A statue of Bolivar was erected here in 1847. In 1827 B. was partly destroyed by an earthquake. Pop. (*Almanach de Gotha*, 1875) 50,000. The tableland in which B. is situated is rich in pasture, and yields abundance of wheat and barley, being visited annually by two rainy seasons. Near the town there are emerald, gold, and silver mines. The *Rio de B.* drains the tableland, forms the remarkable fall of Tequendama, 900 feet high, and joins the Magdalena (q. v.).

Bog'ra, the chief town in the District of the same name, Bengal, British India, on a tributary of the river Attri, 85 miles N.W. of Moorshedabad. Pop. (1872) 5872. The district has an area of 1491 sq. miles, and a pop. (1872) of 689,467. In 1876-77 the exports included £121,000 of rice and £80,000 of jute.

Bog'-Spavin, a disease in horses, affecting the hock-joint, and exhibiting as its chief feature a swelling and distended state of the joint-capsule (capsular ligament). It is generally caused by a sprain or sudden start, and in all probability is most frequently found in horses in which inflammatory or other lesions of the joints already exist. Soft swelling of the joint, complete lameness, and inflammatory symptoms, are the chief aids to the diagnosis of this affection; the swelling having a 'boggy' feel, and remaining persistent after the acute symptoms have disappeared. The treatment of B.-S. consists in the ordinary antiphlogistic remedies—fomentations, with liniments and blistering afterwards to favour resolution. The condition is one very difficult, and in some cases impossible to cure.

Bog'-Trotter, a derisive appellation occasionally given to the Irish peasantry from their living in a boggy country, their ability to traverse which with safety and expedition has often saved them when pursued by the officers of justice.

Bogus, Rev. D., was born in the parish of Coldingham, Berwickshire, 18th February 1750. He was licensed as a preacher of the Church of Scotland, but went to London in 1771, and afterwards became pastor of an Independent congregation at Gosport, where he also established a college for Independent ministers. From this time he became a zealous worker in the cause of missions, and took an active part in the establishment

of the British and Foreign Bible Society, of the Religious Tract Society, and especially of the London Missionary Society, of which last he has been called the father. B. died 25th October 1825. Besides some minor works, he wrote, in conjunction with James Bennett, a *History of Dissenters from 1688 to 1808* (4 vols. Lond. 1808-12). His *Theological Lectures*, edited by Frey, were published at New York in 1849.

Bo'gus is an Americanism, and is often used in the sense of *sham* or *fraudulent*, as B. money. B. election-tickets, having some names of the opposite party on the list, are sometimes put into the hands of the voters at the polls.

Bo'guslav, a town of Russia, government of Kiev, situated on the Rossa, 60 miles S.S.E. of the city of Kiev. Pop. 6000, chiefly Jews.

Bohea'. See TEA.

Bohe'mia (Ger. *Böhmen*), so called after the Boli, who settled in it in the 2d c. B.C., formerly an independent kingdom, now a crown-land of Austria, in lat. 48° 33'-51° 5' N., and in long. 12°-16° 46' E. It is bounded N. by Saxony and Prussian Silesia, E. by Prussian Silesia and Moravia, S. by Upper and Lower Austria, and W. by Bavaria. Area, 20,000 sq. miles; pop. (1869) 5,140,544, of whom 4,940,898 are Roman Catholics, 89,933 Jews, and the remainder belong to different Christian sects.

Physical Aspect, &c.—B. is encircled by mountains: W. by the Böhmerwald, N. by the Erzgebirge, E. by the Iser-Riesen- and Adlergebirge, and S. by the Bohemian-Moravian plateau. The elevations range from 2000 to above 5000 feet, while offsets traverse the interior from N. to S., enclosing many fertile valleys. The slope of the country is towards the centre. The principal river is the Elbe, with its great affluents the Moldau, Iser, and Eger. Instead of lakes there are numerous ponds and morasses. The climate is considered healthy, but is cold in the highland borders, and snow lingers on the summits of the hills through a great part of the year.

Products.—B. has very little waste land. Over 90 per cent. of the soil is available for culture, and of this more than a half is arable. Grain is raised in abundance, the principal crops being wheat, oats, barley, and rye, much of which is exported; hop and flax are important products; the cultivation of root crops is becoming general; the forests are extensive and valuable; and the vine is partially cultivated. Cattle-breeding is not skilfully carried on, but the breed of horses is superior. In some districts swine are reared in large numbers, while in the S. flocks of geese form a considerable portion of the cultivator's stock. B. has great mineral wealth in silver, tin, iron, lead, graphite, granite, coal, and marble; but there are no salt-mines. Its mineral springs are among the most noted in Europe—e.g., Karlsbad, Marienbad, Franzensbad, and Teplitz.

Manufactures, &c.—The industries of B. are the most important in the Austrian empire. Their chief seat is in the N. Altogether it is computed there are about 1400 manufactories, whose yearly production is valued at £20,000,000. Reichenberg is the headquarters of the woollen, Rumburg of the linen, Schönlinde of the thread, and the Erzgebirge of the lace manufacture. There are upwards of eighty cotton-mills, with 500,000 spindles, of which the largest are at Reichenberg. There are calico-printworks on a large scale in Prague, Hirschberg, &c. Bohemian glass, which is not only the best in Austria, but perhaps the best in the world, is manufactured at Haida, Stein-schönau, Gablenz, Turnau, Burgstein, and Neuhurkenthal. In addition to these, B. has manufactures of sugar (from beetroot), leather, porcelain, paper, metallic wares, chemicals, and beer. For its import and export trade there are not very good water highways, but there is an admirable network of railways converging in Prague. There are Chambers of Commerce at Prague, Reichenberg, Eger, Pilsen, and Budweis.

Government, Administration, Education, &c.—B. is divided into thirteen circles—Präuge, Leitmeritz, Gitschin, Jung-Bunzlau, Königgrätz, Chrudim, Czaslau, Tabor, Budweis, Pisek, Pilsen, Eger, Saaz. It has its own provincial Diet, or Parliament, consisting of one house of 241 members, representing in different degrees the various classes and orders of the community; and it sends fifty-four representatives to the Austrian Reichsrath. B. has one university, that of Prague, twenty-two gymnasias, numerous real and technical schools, and nearly 4000 elementary schools;

yet it is to be said that, though education is widely diffused, Bohemian educational institutions still stand in need of reform.

History, &c.—B., originally in the possession of the Boii, was seized by the Marcomanni in the 1st c. A.D. The latter in turn were destroyed or driven out by the Czechs—the ancestors of the present Bohemians—in the first half of the 6th c. A.D. About the year 627, Samo, uniting the neighbouring Slavic lands with those of the Czechs, formed a kingdom, which, however, fell to pieces on his death, in 662. Partly dependent under the Karolings, it next became tributary to the Moravian prince, Swatopluk (871–894), who introduced Christianity. The Czech chieftains, on the death of Swatopluk, did homage to the German king, Arnulf. About the year 900, Spithinew I. obtained the supreme power in the land; but his nephew, St Wenzel, was forced by the march of Heinrich I. on Prague, 929, to acknowledge the suzerainty of the German emperors. Nor did this feudal dependency of B. ever again cease, though at one time it was weaker than at another. Duke Wratislav II. (1061–92) received from the Emperor Heinrich IV. the title of king, which was ever after borne by the rulers of B. After a long period of strife, the succession was secured by Ottokar I. (1197–1230). His grandson, Ottokar II. (1253–78), acquired the duchy of Austria, Styria, Carinthia, Carniola, and ruled from the Baltic to the Adriatic; but lost crown and life in the battle on the Marchfeld in 1278. In 1310 a new dynasty came in with Johann of Luxembourg, son of the Emperor Heinrich VII., who acquired Silesia. Under his son, Karl, who also became Emperor of Germany, B. reached its acme of mediæval prosperity, which the Hussite wars (1378–1419) completely destroyed. After the extinction of the Luxembourg dynasty, in the person of the Emperor Sigismund (1437), the crown became elective, and was first by a Protestant noble, Georg of Podiebrad (1458–71), and afterwards (1471–1516) by Vladislav II., who being chosen king of Hungary (1490), removed his residence to Ofen or Buda. On the death of his son, Ludwig, who fell in the battle at Mohacz (1526), B., together with Hungary, passed to the Archduke Ferdinand of Austria, and its later history, though deeply interesting, and at times tragic, is blended with the fortunes of the House of Hapsburg (see AUSTRIA). Since the revolution of 1849, B. has shown a marked disposition to reassert its Czechic character, and to insist upon an amount of autonomy little short of independence. The Austro-Prussian war of 1866 has raised its hopes of securing the triumph of its nationality in education, politics, literature, &c. See Pelzel, *Geschichte der Böhmen* (Prag, 1772; 4d ed. 1817); Palacky, *Geschichte von B.* (Prag, 1836–60); Jordan, *Geschichte des Böhm. Volks und Landes* (Leips. 1845–47), and *Fontes Rer. Bohem.* (3d. vol. 1878). For a notice of the important language and literature of B., see CZECHS.

Bohemian Brethren, a strictly religious body, which survived after the politico-religious confederation of the Hussites (q. v.) had been finally broken up in 1453. The members assumed the name of 'Brethren of the Law of Christ,' and were distinguished as *B.* or *Moravian B.*, according as they lived in Bohemia or Moravia. In 1467 they formally constituted themselves a sect by electing elders, whom they afterwards, 'for expediency,' got ordained as bishops by Stephen, an exiled bishop of the Waldenses. In 1481 they were persecuted and driven from Moravia, but most of them returned six years after. As regards doctrine, at this time they rejected the doctrines of purgatory, worship of saints, and transubstantiation, though retaining that of the real presence in the Eucharist. Afterwards their views coincided generally with those of Calvin. In the beginning of the 16th c. the B. B. numbered about 200 congregations in Bohemia and Moravia, and their numbers were at that time augmented by many of the Calixtines (q. v.); but in 1627 they were again driven from both countries, and since then most of them have been found in Poland. See Camerarius, *Hist. Narr. de Fratr. Orthod. Eccl. in Boh. Mor. et Pol.*; Comenius, *De Eccl. Fratr. in Boh. et Mor.*; Eisner, *Brevis Conspectus Doctr. Fratr. Boh.*

Bohemond I., eldest son of Robert Guiscard, the Norman Duke of Apulia and Calabria, was born about 1065, and distinguished himself by his victories over Alexius Comnenus, the Greek emperor, at Janina and Arta, though these were neutralised by the successful intrigues of his opponent. His father dying in 1085, left the dukedom to his youngest son, Roger, from whom B. wrested the principality of Tarentum, but only after

a bloody struggle. Joining the first Crusaders in 1096, with 10,000 horse and 20,000 infantry, he first tried to persuade Godfrey to turn his arms against Alexius, who sought to disarm his hostility by the splendour of his reception and the magnificence of his presents. On the march through Asia Minor, B. was conspicuous by his valour and endurance. When Antioch fell he was invested with the sovereignty, receiving investiture at a later period from the Patriarch of Jerusalem. His title was afterwards recognised by the emperor, who was constrained by the successes of B. to grant him an advantageous peace. He died in Apulia in 1111. The Christian principality of Antioch lasted for 170 years under nine princes, the last of whom was B. VI., who was forced to surrender the city to Bibars, the Mameluke Sultan of Egypt, in 1268. See Gibbon, *Decline and Fall of the Roman Empire*, ch. 58–59.

Böhme, or Beh'men, Jakob, the mystic cobbler, was born in 1575 at Alt-Seidenberg, near Görlitz, in Lusatia. With the exception of his *Wanderjahre* and a visit to a public discussion of his books at Dresden shortly before his death, he spent his life at Görlitz, cobbling and dreaming. He read the mystics Weigel and Schwenkfeld, and adopted from Paracelsus the doctrines of the Mikrokosm (viz., that the analogy between individual and cosmic life is perfect), and of the triad of sulphur, salt, and mercury. His chief friends were Frankenberg, who wrote the biography prefixed to Gichtel's edition of B.'s works (1682, translated by Fras. Okely, 1870), Dr Kober of Görlitz, and Dr Walther, a Dresden chemist. In 1612 he completed his *Aurora, or Morgen Röthe im Aufgang*, the result of two 'illuminations' or short periods of intense cerebral excitement which occurred in 1600; and ten years later Richter, chief pastor of Görlitz, tried unsuccessfully to banish B. from the town. In 1619 he completed his *Three Principles of the Divine Being*, and later a discourse on *Repentance*. B. died 21st November 1624. The last edition of his works is that of Schiebler (Leips. reprinted 1861). Under the Commonwealth there were in England societies of Behminists. John Pardage, royalist clergyman and medical man, and Jane Lead of Norfolk, endeavoured about 1697 to revive B.'s doctrines among the Philadelphists. William Law of Oxford translated B.'s works in 1764, and expounded part of them in his *Spirit of Prayer*. B.'s characteristic belief was in a revelation of truth from within. This was, of course, harmonised with the Bible, but it declined the authority of creeds. Salvation was not possible through assent to propositions; man must recognise his three natures (terrestrial, astral, and celestial), and his true relation to God—that of 'nothingness' to the 'All.' An *à priori* scheme of the Trinity is given; evil is explained by the logical doctrine of contraries; and nature, or the *mysterium magnum*, the *Urgrund*, the eternal will of the Eternal Spirit, is represented as governed by the seven forms or fountains of life—viz., the astringent, sweet, and bitter qualities, and the qualities of fire, love, sound, and essential substance. These forms are traced through organic and inorganic nature, and even in the human spirit. Thus the bitter is seen in sulphur, the planet Mars, war, dogs, red colours, and choleric temperaments. It is obvious that B.'s generalisations are those of a strong uncultivated fancy, and quite devoid of philosophical value. His worth consists in the sincerity of his religious experience, and his courage in trying to express to others what he felt to be the true paradise of the soul. His own account of the regenerate man was, 'Wem Zeit ist wie Ewigkeit, und Ewigkeit wie Zeit.' See Fechner, *Jakob B., sein Leben und seine Schriften* (Görlitz, 1857).

Bohn, Henry George, a scholarly and enterprising publisher, of German extraction, was born in London, January 4, 1796. He was one of the earliest and most active promoters of the movement in favour of cheap and genuine literature, in the interests of which he published his standard historical, classical, scientific, philological, ecclesiastical, reference and antiquarian libraries, amounting in all to about 700 volumes. He is also well known as the translator of Schiller, Goethe, and Humboldt, as the editor of the *Bibliotheca Parriana*, Lowndes' *Bibliographer's Manual*, and Addison's works, and as the compiler of a *Polyglot of Foreign Proverbs*, an *Illustrated Handbook of Geography*, a *Handbook of Pottery and Porcelain*, &c. B. is also a distinguished antiquary, and a member of many learned and scientific societies.

Boiardo, Matteo Maria, Count of Scandiano, a famous Italian poet, was born at Scandiano, in Lombardy, 1439-34, and studied at the University of Ferrara. He lived for some time at the court of the great patron of letters, Duke Borso d'Este, and was subsequently made governor of Reggio (1478), then of Modena (1481), and once more of Reggio shortly before his death, which took place December 21, 1494. His lesser works comprise *Sonetti e Canzoni* (Reggio, 1499); *Il Timone*, a drama in five acts (1500); *Cinque Capitoli in Terza Rima* (1523); and *L'Asino d'Oro*, a free translation of the *Golden Ass* of Apuleius (1523); but by far his greatest effort is the *Orlando Innamorato*, an unfinished poem based on the chivalrous fable of Charlemagne. While the earlier poets had contented themselves with representing the nephew of the great emperor purely as a Christian champion, B., who was familiar with the general character of mediæval romance, and particularly with that of the Arthurian cycle, sought to add a new grace to the tale by introducing the element of the love of woman. The loves of Orlando and 'the fairest of her sex, Angelica,' are told with a freshness and splendour of fancy that ought to have ensured the work a perpetual popularity; but, as Hallam justly remarks (*Intro. to the Lit. of Europe*, part i. ch. iii.), 'it has not received that share of renown which seems to be its due; overpowered by the splendour of Ariosto's poem (the *Orlando Furioso*, which was suggested by it), and almost set aside in its original form by the improved edition or remaking (*rifacimento*) which Berni afterwards gave, it has rarely been sought for or quoted, even in Italy.' This is substantially true. Up to 1545, indeed, it would seem to have been greatly relished, for between that year and the date of the *editio princeps* (1495), it had passed through no fewer than sixteen editions. But after 1545 it was never again reprinted till 1830, when Panizzi published an excellent edition, with notes and introduction, in 9 vols. See also Wagner's text in the *Parnasso Italiano Continuato* (Leips. 1833). The poem was translated into French as early as the 16th c., and of late years versions of it have appeared in most of the languages of Western Europe.

Boieldieu, François Adrien, 'the French Mozart,' born at Rouen, 15th December 1775, received his first instructions in the cathedral of his native city, and was, with Auber, a pupil of Cherubini. After a busy and prolific career, he died, 8th October 1834. His opera of *La Dame Blanche* (the 'White Lady of Avenel' in Sir Walter Scott's *Monastery*) has been extremely popular in France, but none of his works have become well known in this country. His principal operas are *Le Calife de Bagdad* (1799), *Jean de Paris* (1812), *Le Nouveau Seigneur* (1813), and *Le Chaperon Rouge* (1817). His son, **Adrien B.** (born 1816), is also a composer, and produced the opera *La Hôte du Roi* at Rouen on his father's centenary in 1875.

Boi'i, a Celtic people, who emigrated from Transalpine Gaul into Italy, where they occupied the old seat of the Umbrians, between the Po and the Apennines. In B.C. 283, the B. were defeated by the Romans at the Vadimonian lake, and thereafter prolonged through numerous campaigns, especially in support of Hannibal, but sometimes single-handed, their resistance to the Roman arms, till their complete defeat by Scipio Nasica, B.C. 191. They were subsequently compelled to recross the Alps, and dwelt for more than a century in a part of modern Bohemia (which derives its name from them), but were ultimately exterminated by the Dacians.

Boil, sometimes called *Furunculus* (from *ferveo*, to burn), is a name given to an inflammation of the skin. This inflammation is limited, and the skin becomes enormously thickened. The swelling is conical, with a hard base, and contains pus at its apex. B. is exceedingly painful, is most common in the young and middle-aged, generally always in robust and florid people, and most frequently in the spring-time. B. is seldom single, and is most frequently on the parts where the skin is thickest, as back, shoulders, hips, back of neck, &c. B. is generally due to derangement of the general health. Treatment is both local and general. Local treatment consists in applying hot fomentations and poultices; in some cases of great pain a free incision does good by relieving tension. When suppuration has formed, a free incision permits the pus to escape, and also the 'core,' which must slough out before the flesh around can heal. Poultices and afterwards hot-water dressings are to be applied. Constitutional treatment consists in attend-

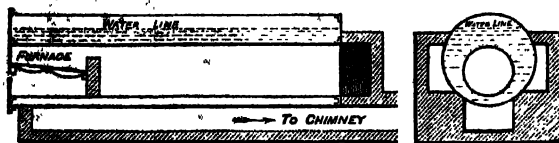
ing to the general health, administering a saline purgative, as Epsom salts, followed by quinine, iron, or other tonics. Great attention must be paid to diet, which should be non-stimulating and not too rich.

Boileau Despréaux, Nicolas, the greatest of the earlier French critics of *belles-lettres*, was born at Paris, 1st November 1636. Educated at Beauvais for the Church, he chose literature, or rather poetical criticism, as a profession. Between 1660-68 B. produced his nine *Satires*, in which he assails the pedantic worship of classical Spanish and Italian models in such men as Scudery and Quinault, and even in Corneille, the heroes of the Hôtel Rambouillet. From 1669-77 he produced *L'Art Poétique* (imitated by Pope in the *Essay on Criticism*), in which he enunciates positive rules of art, illustrating them by reference to distinguished contemporaries; the greater part of *Lutrin* (the model of Pope's *Rape of the Lock*, but not equal to the brilliant performance of the Englishman), a mock-heroic directed against the Parisian canons; a translation of Longinus *On the Sublime*; *Les Héros de Roman*, another blow in imitation of Lucian against the romantic school; and his first nine *Épîtres* on such subjects as self-knowledge, false shame, the usefulness of jealousy, pleasures of the country, &c. B. was now appointed, along with Racine, royal historiographer. His publications during the last years of his life (including three more *Épîtres*) are inferior; but his letters, extending from 1672 to 1710, are valuable as literary history. Many are addressed to Racine, of whom, and of Molière and La Fontaine, he was an intimate friend. B. died at Auteuil, 13th March 1711. He was an upright man, of warm and generous feeling. He aided struggling talent, and protected the unpopular Arnauld and the aged Corneille. As Madame de Sévigné says, 'he was cruel only in verse.' He had no profound knowledge of French literature or of the general laws of poetical expression, but he substituted common sense as a literary standard for the ridiculous 'conceits' which Molière has referred to in *Les Précieuses Ridicules*. B. has had an immense, and on the whole beneficial, influence on the national literature. Upwards of sixty editions appeared in the author's lifetime, and more than 350 in all have appeared. The best is that of Berriat Saint-Prix (Par. 1830; 1860). See Desmaizeaux, *Vie de Nic. B. Despréaux* (Amst. 1712); also Laverdet, *Correspondance de B.* (Par. 1858). B. had two elder brothers; the one, Gilles (born 1631, died 1669), translated Diogenes Laertius; the other, Jacques (born 1635, died 1716), wrote a *Historia Flagellantium*, and many other ecclesiastical and theological works.

Boiler, a vessel in which steam is generated. A B. may be either open or closed; in the former case, the temperature of the steam formed remains at or near 212° F., and its pressure is the same as that of the atmosphere, or about 14.7 lbs. per square inch; in the latter case, the temperature and pressure may be made to exceed these limits to any required extent. Two considerations mainly determine the form of a B.—viz., its strength to resist internal pressure and its efficiency in producing steam. The best B. is that which has sufficient strength safely to withstand the pressure to which it is subjected, combined with such a form and arrangement as shall enable the water to abstract a maximum of heat from the gases of combustion. The spherical form is the strongest, and seems to have been the earliest used; it presents to the fire, however, a minimum of surface in proportion to its contents, and therefore has a low efficiency as a steam-raiser. After spherical boilers cylindrical ones came into use, at first set on end, and afterwards placed horizontally. Later on these were furnished (as now used) with internal cylindrical tubes for furnaces. Watt's 'wagon' B. (so called from its shape) was used for many years, but being quite unfit for any but very low pressures, it has long been discarded. So long as the steam pressures employed were only a little above atmospheric pressure, it was common to make boilers with flat sides, to which stiffness was given by internal stays; but now that it is quite common to use pressures of 50 lbs. per square inch and upwards above atmospheric pressure, a form of B. has to be employed which shall be strong enough without such stays, which it would be most inconvenient to provide in such cases. It is for this reason that the cylindrical form is the one now chosen almost invariably for the B. shell.

Boilers may be classed as (a) horizontal, vertical, (b) internally and externally fired, or (c) plain, multitubular, and tubular. Large boilers are almost invariably horizontal, the vertical

form being only used in the small boilers of steam cranes or traction engines, or in connection with some furnaces, or in other places where length cannot be so easily provided as height. In this country, where the fuel commonly used is tolerably good coal, boilers are generally fitted with internal furnaces; but upon the Continent, where the fuel is inferior, external firing is often advisable and economical. All ordinary cylindrical boilers come into the class of 'plain' boilers. They are the simplest and cheapest that can be made, and when properly proportioned they possess a very considerable evaporative efficiency. The common Cornish B. is the leading type of plain



Longitudinal Section.

Cross Section.

Cornish Boiler set in Brickwork.

boilers. Its shell is a cylinder (from 4 to 8 feet diameter), placed horizontally, and encloses a smaller cylinder called a flue, which is always surrounded by water, and in which, at its front end, the fire-grate is placed. The Lancashire B. is similar to this, but has two flues. The Galloway B., which resembles a Cornish B. with cross water tubes placed in the flues, is probably the most perfect type of plain horizontal B. Where it is necessary to economise space or fuel, or both, a multitubular B. is commonly used. In this the flame and gases of combustion are made to pass through a number of tubes surrounded by water, commonly from 2 to 4 inches diameter, on their way to the chimney, so that a multitubular B. offers a much larger surface to the flame than a plain one of the same bulk, and its steam-generating power is correspondingly increased. Marine boilers are invariably multitubular, as are locomotive boilers also. Tubulous boilers not only contain tubes, but consist of them entirely. They possess some advantages on the score of safety when very high pressures are used, but those hitherto designed have for the most part been defective in means for causing the water to circulate, and have not, consequently, realised all the advantages expected of them either in security or economy.

In a good marine B., 1 lb. of good coal evaporates 10 or 11 lbs. of water from and at 212° F. In a less perfect B., and with inferior fuel, the evaporation is proportionately less, being sometimes only one-third as much.

Boilers are always made of wrought-iron plates, of a thickness proportioned to the diameter of the B. and the pressure of steam. The plates have occasionally been welded together, but are in almost every case fastened by rivets. The tubes are generally of iron, but sometimes of brass. Copper is occasionally used for the fire-box plates of locomotives, but very rarely elsewhere. The larger class of land boilers are commonly set in brickwork, forming a system of flues through which the products of combustion pass on their way to the chimney.

The destruction of boilers is principally due to two causes—(1) the burning of the plates in places where a solid deposit ('scale') has formed upon their inner surfaces, and (2) the corrosion of the plates by the chemical action of various impurities in the water. See COMBUSTION and FUEL.

Boiling, in cookery, is one of the most frequent and important operations connected with the preparation of food. It is a process applicable to almost all varieties of food and every kind of culinary preparation, and the necessary appliances are simple and inexpensive. In the boiling of animal food, if it is desired to retain the nutritive juices within the substance, the meat to be boiled should be suddenly plunged entire in boiling water, and briskly boiled a few minutes. This coagulates the albuminous matter in the outer portion of the meat, and prevents the exudation of the fluid juices within. Thereafter the water should be maintained somewhat under the boiling-point till the meat is sufficiently dressed, a period which varies according to the amount being operated on. By this means the meat is kept at once juicy, tender, and nutritious. When meat is boiled for the preparation of broths or soups, it should be cut up into small pieces, placed in cold water, and gradually brought to the boiling-point, by which means the juices are transfused through the liquid, the

meat consequently becoming in proportion less nutritious. Fish ought to be boiled in water containing a quantity of salt, as it is thereby rendered firmer, and retains a fuller flavour. The boiling of food starches such as arrowroot, corn-flour, &c., ruptures the starch granules, and renders them digestible, and the same thing occurs in boiling meal, flour, and vegetables generally, which all contain starch in large proportions. Boiled food is more digestible than the same either roasted or stewed, but it wants the empyreumatic odour and sapidity communicated by these processes. It is the most economical of these three processes, as shown by the following table of percentage of loss, extracted from Dr Letheby's *Food*:

	Boiled.	Baked.	Roasted.
Beef	20	29	31
Mutton	20	32	35
Leg of mutton	20	32	33
Shoulder of mutton	24	32	34

See COOKERY.

Boiling-Point of a liquid is that temperature at which the liquid *boils*—i.e., the temperature at which it gives off vapour freely. When this point is reached, the temperature of the liquid undergoes no further change, the energy of the heating being all spent in converting the liquid into a gas. When a liquid is becoming gaseous, it expands and does work. If the pressure be increased, more work will require to be done to expand it to the same amount, and therefore, according to the conservation of Energy (q. v.), more heat will require to be spent, and the B.-P. will consequently be raised. Similarly, if the pressure be diminished, the B.-P. will be proportionately lowered; and this is found to be the case in elevated regions where the atmospheric pressure is considerably diminished. The variation of the B.-P. of water may thus be used for determining heights. See also PAPIN'S DIGESTER, GEYSERS, and SPHEROIDAL STATE OF LIQUIDS.

Bois Blanc, an island, at the N. end of Lake Huron, U.S., America, 10 miles long and 3 broad, is provided with a lighthouse at its eastern extremity.

Bois-de-Boulogne. See BOULOGNE.

Bois-le-Duc (Dutch, *Den Bosch* or *Hertogenbosch*, 'the Duke's forest'), a strongly fortified town and capital of the province of N. Brabant, Netherlands, at the confluence of the Dommel and Aa, with large manufactures of linen thread, woollens, ribbons, cutlery, jewellery, and cigars. The cathedral, St Janskerke, is a splendid building. B. was founded in 1184 by Godfrey III., Duke of Brabant, the site being the heart of a forest, whence its name. The states from which it had rebelled besieged it in 1601, and again in 1603, but it was not till 1629 that it surrendered. The army of the French republic here defeated the English under the Duke of York in 1794. Pop. (1875) 24,190.

Boisserée, Sulpiz, a celebrated architect and archaeologist, was born at Cologne, 2d August 1783. Assisted by his younger brother, Melchior, and a friend, Johann Baptist Bertram, he gathered together with great labour, and classified with consummate skill, 200 specimens of early German art which had got widely scattered. These pictures were first arranged in historical periods at Stuttgart, in a spacious building presented to the brothers for that purpose by the King of Württemberg, and the study of the collection has shed great light on the sources of mediæval art in Germany. In 1827 the 'Boisserean Collection' was sold to the King of Bavaria for 120,000 thalers. In 1836 the pictures were hung up in the Pinakothek (picture-gallery) of Munich, where they still remain. S. B. died 2d May 1854, his brother Melchior 14th May 1851. The elder brother published *Ansichten, Risse und einzelne Theile des Doms zu Köln* (Stuttg. 1822-31); *Die Denkmale der Baukunst vom 7 bis 13 Jahrh.* (Stuttg. 1831-33); *Ueber den Tempel des heiligen Graal* (Mun. 1834); *Die Kaiser-Dalmatika in der Peterskirche zu Rom* (Mun. 1842). His widow published his biography and selections from his correspondence in 1862, under the title *Sulpiz B.*

Boissonade, Jean François, an eminent French scholar, was born at Paris, 12th August 1774. In his youth he held office under the ministry of Dumouriez, and subsequently under Lucien Bonaparte. In 1809 he succeeded Larcher as Professor of Greek Literature to the Faculty of Letters of the Academy of Paris; and in 1828, on the death of Gail, he became Professor of Greek Literature in the College of France. His lectures from three chairs gave

a great impulse to philological studies in France. He issued an immense number of works, especially of authors till then unedited, or editions of classics enriched by commentaries, which display sound and learned criticism. Among these publications were the *Life of Proclus* by Marinus (Leips. 1814); the *Letters* of Lucas Holstenius (Par. 1817); *Lives of the Sophists* by Eunapius (Amst. 1822); the *Dialogue* of Psellus on *The Work of Demons* (Nürnb. 1838); the *Letters* of Aristænetus (Par. 1822); the *Letters* of Philostratus (Par. 1842); the *Fables* of Babrius (Par. 1844), of Syntepas (Par. 1828); *Anecdota Græca* (5 vols. Par. 1829-44), and *Anecdota Nova* (Par. 1844). In addition to his own separate works, B. made innumerable contributions, philological and critical, to the works of others, to classical journals, and to the daily press of Paris. He died in September 1857.

Boiss'y d'Anglas, François Antoine Comte de, a celebrated French publicist, born in the department of Ardèche, 8th December 1756, and came, while still young, to Paris, where he soon acquired a high literary reputation. In 1789 he was chosen a deputy to the States-General, in 1791 became secretary to the National Assembly, and on the eve of 9th Thermidor united with Tallien and Barrère for the overthrow of Robespierre. Soon after, being charged with the task of provisioning Paris, he was subjected to imminent peril, from which his intrepidity saved him, and procured for him the thanks of the Convention. He was afterwards loaded with honours both by Napoleon and Louis XVIII., and died at Paris, 20th October 1826. In addition to numerous brochures of ephemeral interest, he published an essay on Malesherbes, with notes, letters, and unedited pieces (*Essai sur la Vie, les Écrits, et les Opinions de Malesherbes, &c.* (2 vols. Par. 1819 and 1821), and *Recueil de divers Écrits en Vers et en Prose* (Par. 1825). See *Notice sur la Vie et les Ouvrages de B. d'A.* in the *Mémoires de l'Académie des Inscriptions*, t. ix. p. 146.

Bois-tan, the name applied to the fruits of *Byrsonima spicata*, a tree of the natural order *Malpighiaceæ*, which are used in dysentery. In Brazil the bark is also used for tanning.

Bojador, Cape (Port. *bojao*, to bend outward), on the W. coast of Africa, forming one of the projecting points of the Great Desert, rises to a considerable height, and is the southern limit of the low, flat, gently sloping coast, one of the most dangerous in the whole globe, which extends as far N. as Cape Nun. Cape B. was doubled by Gilianez, a Portuguese navigator, about the year 1432.

Boja'no, a town in the province of Campobasso, Central Italy, 13 miles S.W. of Campobasso, and 92 miles S.E. of Rome. It stands on a rocky hill, has a cathedral, and contains several parts of an ancient wall. Pop. 3000. It is said to occupy the site of the ancient Samnite capital, *Bovianum* ('Ox-town'); but T. Mommsen, who has investigated the topography of the place, is of opinion that the famous Samnite city lay 20 miles N., where ruins are still visible.

Bojar (pronounced *Boiar*, 'a warrior'), a class of Russian nobles, now extinct. The B. was originally a popular 'hero' in all the Slavic lands; but afterwards the name was definitely given to an independent landholder. In the old Russian gradation of ranks, he came next to the *Knjase*, or *prince*. He was the follower of the *Knjase*, but not his feudatory. The B. had a train of his own dependants, and could select the prince whom it pleased him to aid, as well as shift his allegiance if he thought proper. The Bojars had a prescriptive right to the chief posts both in the army and the civil administration, and possessed a power which even the Czar respected. The peculiarly Slavonic custom of *miestnicestvo* entered largely into their order. According to this curious institution, which seems to be Asiatic in origin, property and titles were hereditary, but rank was wholly personal. Military dignity conferred by the Czar, or length of political service, constituted the patents of rank. A B. who had been appointed Councillor of the Empire would take precedence of a noble of the same class, though the latter might be of older family, or have ten times greater wealth. While the B. class existed, it prevented the Russian form of government from becoming an absolute despotism. The imperial ukase admitted its power, being thus framed:—'The Czar has willed, the Bojars have approved it.' Peter the Great finally succeeded in destroying

the order, by elevating its members to the level of the higher nobility, but denuding them of their ancient and peculiar rights. The last of the Bojars died in 1750.

Bokha'ra ('Eastland'), the most important khanate of Central Asia, situated between the river Amu Daria and the sandy desert of Kizil-Kum, with an area of 100,000 sq. miles, and a pop. of some 3,000,000. It is in great part a fertile plain, the eastern portion of which especially is a region of flourishing towns and villages, with their orchards and mulberry groves, and of well-cultivated tracts of wheat, barley, maize, rice, cotton, gourds, and water-melons. The extent of cultivated land is not known, but B. is second only to Khiva in the quantity and quality of its products, while it is unrivalled in Central Asia for the variety and excellence of its fruit. The chief rivers are the Amu (anc. Oxus), near the S. frontier, on its N.W. course to the Aral Sea; the Zarafshan (Pers. 'the scatterer of gold'), rising in the Fan-Tagh mountains in the S. of Kokan, flowing through the heart of the country, and entering the Karakul (Turk. 'black-lake') 50 miles S.W. of the city of B.; the Sogd, an offshoot of the former, which is absorbed by the western steppe; and the Balka, a vast tributary of the Amu, by which the E. portion of the khanate is watered. In metals B. is very rich, there being copper, silver, lead, iron-ore, sulphur, salt, and saltpetre. Gold-washing is carried on in some of the rivers. The industries are chiefly agriculture, the breeding of sheep, goats, horses, and camels, and the manufacture of silk. B. has a healthy climate, but is liable to severe summer heats and to occasional sand-storms. The inhabitants are partly Turkish Tartars, known as Usbeks and Turkomans, and partly Aryan Tajiks, or Persians. They are Mohammedans, partly Sunnites and partly Shiites, who reverence the Khan of B. next to the Turkish Sultan, who is the spiritual head of Islamism.

B. is the ancient Sogdiana, or Maracanda, of which the capital was the modern Samarcand. In the 8th c. it was conquered by the Arabs, under whom it flourished till 1220, when it fell under the power of Genghis Khan, whose descendants were dispossessed by Timur about 1370. It was finally seized (1505) by the Usbeks, who are still the dominant race. After the Russians had annexed part of Khokan in 1865, they found themselves harassed incessantly by the petty attacks of Bokharan troops, and entering the khanate, they gained a decisive victory at Jdjar (1866), and afterwards took possession of the city of Samarcand in 1868. The Khan, Musaffer-Eddin, paid a large indemnity, and ceded Samarcand and the fertile upper courses of the Zarafshan, but was allowed to retain his throne, subject, however, to an annual contribution to the Russian exchequer. B. is being rapidly transformed by Russian influence, which is promoting its trade and introducing the civilisation of Europe into its towns. It aided the Russian forces in the recent Khivan expedition, and in return for this service received (July 1873) a grant of territory on the right bank of the Oxus. See Vambey's *B., its History and Conquest* (Lond. 1873), and E. Schuyler's *Turkestan* (Lond. 1875), and Fedtchenko's *Journey in Turkestan* (St Petersburg. 1875).

Bokha'ra, the capital of the khanate of the same name, and the most important trading centre in Turanian Central Asia, 140 miles W. of Samarcand, on the Khyrabad, a small branch of the Zarafshan. It is surrounded by mud walls, nearly 9 miles in circumference, and in its centre, on an elevation of between 200 and 300 feet, stands the Khan's palace, together with the harem, public offices, barracks, and royal stables. The city has long been celebrated in Central Asia as a seat of learning, being called the 'Treasury of Sciences,' and has 180 mosques, with high minarets, nearly 100 academies of Mohammedan theology, and numerous schools. But B. is still more important as a mart or entrepôt for the growing caravan commerce of Turkestan with China, India, Persia, Siberia, and Europe. It has also considerable manufactures, chiefly of silk stuffs, cotton, thread, firearms, shagreen, and jewellery. Pop. estimated at from 70,000 to 180,000.

Bokha'ra Olo'ver. See MELILOT.

Bolabola, or **Bo'rabora**, one of the Society Islands, in the S. Pacific Ocean, about 200 miles N.W. of Tahiti, in lat. 16° 32' S., and long. 151° 52' W. It is surrounded by coral reefs, contains a lofty hill, and has a coast-line of about 24 miles. The rest of the group is under the French protectorate, but B. forms an independent state. Pop. 1800, chiefly of Malay race.

Bolan, one of the two historical passes leading from India into Afghanistan, through the Sulaiman range. The point of departure is Sukkur on the Indus in Scinde. From Dadur, at the foot of the Pass, to Quetta (q. v.), at the farther end, is about 54 miles, the greater part of the route being a narrow gorge, enclosed between precipitous cliffs. In one day's journey of 10 miles, the B. river has to be crossed no less than seventeen times. The summit of the Pass is 5900 feet above the sea. By this route a British army marched to the capture of Candahar, in 1839, and again in 1878. The annual value of the trade by the B. Pass is estimated at £50,000.

Bolbec, a town of France, department of Seine-Inférieure, on a small river of the same name, and on the Havre and Paris Railway, 18 miles E.N.E. of Havre. It has increasing manufactures of woollens, linens, printed cottons, and chemicals. Pop. (1872) 9048.

Bol'do, or **Bol'du**, a small tree, *Boldoa fragrans*, growing in Chili, the leaves of which yield an essential oil, and an alkaloid termed *boldine*. They have been recently imported into Europe, and proposed for medicinal use in liver complaints. The bark of B. is available for tanning.

Bole, an earthy unctuous clay, coloured red, yellow, or brown, according to the quantity of iron present, as ferric oxide with silica, alumina, and water make up its usual constituents. It is found in Saxony, Bohemia, Silesia, Styria, Italy, &c. The chief varieties are—*Armenian B.*, of a fine bright red colour, used as 'keel' for red marking, in the preparation of a tooth-powder, and in India as a tonic and astringent; *B. of Blois*, of a yellow hue, and containing carbonate of lime, which effervesces with acids; *Bohemian B.*, a yellowish-red variety; and *French B.*, a pale red, with streaks of yellow. The Lemnian earth, formerly in medicinal repute as an astringent, tonic, &c., is also a kind of B.

Bole'ro, a Spanish national dance. Its music is in triple time, and has a strongly marked rhythm.

Bol'etus, a genus of *Fungi* (q. v.), division *Hymenomycetes*, subdivision *Polypori*, many species of which are edible. In general appearance most of them resemble the common mushroom (*Agaricus*), but instead of having gills on the under surface of the umbrella-like cap (*pileus*), their place is occupied by a porous substance, which looks as if it was composed of a number of tubes placed side by side. *B. edulis*, though not highly valued in Britain, is commonly eaten on the Continent. It is believed to be the 'suillus' of the ancient Romans, who obtained it from Bithynia. *B. aestivalis* is still better, having when ripe a nutty flavour. *B. scaber*, *B. bovinus*, *B. castaneus*, *B. chrysenteron*, *B. luridus*, and *B. subtomentosus* are less valued, and the three last named are even said to be sometimes poisonous. *B. Grevillei*, *B. flavus*, *B. granulatus*, *B. collinitus*, *B. luteus*, *B. elegans*, *B. flavoidus*, *B. versipellis*, *B. leucomelas*, and *B. ovinus* are also edible. See Cooke, *Fungi, their Nature and Uses* (1875).

Boleyn, **Boulen**, or **Bolen**, **Anne**, one of the wives of Henry VIII., was born about 1507. Her father was Sir Thomas B., afterwards Lord Rochford and Earl of Wiltshire, and her mother a daughter of the Duke of Norfolk. When about seven years of age, she went to France with the Princess Mary, sister of Henry VIII. Returning to England, she became one of the maids of honour to Catherine of Aragon, and her great personal beauty excited a strong passion in the king, which, however, she refused to gratify unless she were made his wife. This refusal may be said to have hastened the Reformation in England. Henry, enraged at the refusal of Rome to declare his marriage with Catherine null, contracted a private marriage with Anne about the end of 1532 or the beginning of 1533, in which year he also declared himself, and not the Pope, the supreme head of the Church. In September 1533 Anne gave birth to a daughter, afterwards Queen Elizabeth. For a short time she retained her hold upon Henry's affections, but in 1535 he became alienated from her, and transferred his love to Jane Seymour. Anne was then arraigned on the charge of adultery with several of the courtiers, including a musician of the name of Smeton, and her own brother, Lord Rochford, also with conspiring against the life of the king; and being condemned by a council of peers, was beheaded May 19,

1536, praying for a blessing on Henry. Whether Anne was guilty or not is one of those historical mysteries which appear destined never to be solved. She had undoubtedly a strongly sensuous nature, which was transmitted to her daughter; and before Henry took proceedings against her, grave reports as to her character were current in the court. These, however, may be accounted for by the free manners which she had acquired in France, and it is certain that she never confessed to infidelity, although it is believed that she admitted to Crommer some engagement which rendered her marriage with Henry illegal. Anne seems to have been a friend to the Reformation, and favoured the translation of the Bible. See Froude's *History of England*, and Miss Benger's *Memoirs of Anne B.* (2 vols. Lond. 1821).

Bolingbroke, **Henry St John**, **Viscount**, one of the most celebrated Tory statesmen, orators, and pamphleteers of the 18th c., was born at Battersea, 1st October 1678, of an ancient and distinguished family. One of its members was the celebrated lawyer on the side of the Parliament, Oliver St John, who defended Hampden in the ship-money trial, and was made a chief justice by Cromwell. B., who was educated at Eton and Christ Church, Oxford, seemed likely to waste his energy at the beginning of his career in dissipation, in regard to which he avowed his intention to rival his kinsman Rochester. When, however, he entered Parliament in 1700, as member for Wootton Bassett, he found a worthier vent for his powers in political ambition. He attached himself to the moderate Tory party, of which Harley was then the head, and his brilliant talents and great eloquence, added to a singularly fine presence, and a manner in which dignity was mingled with sweetness, soon made him, next to Harley, the foremost man in his party. In 1704 B. was appointed Secretary at War in the Godolphin administration, but retired in 1708 when Marlborough and Godolphin allied themselves with the Whigs. On the fall of the latter he returned to power as Foreign Secretary, the colleague, but in reality the rival, of Harley. He negotiated the peace of Utrecht in 1713—the year before which he had been elevated to the House of Lords as Viscount B. The jealousy between him and Harley ended in a quarrel and the expulsion of the latter from the position of Premier and Lord Treasurer, to which B.—who had been in correspondence with the Pretender, chiefly because he thought Queen Anne favoured him—succeeded in July 1714. The death of his sovereign, however, blasted his prospects. On the accession of George I. he was deposed from office, fled to France in March 1715, and some months later was attainted. In France, he held for a short time the office of Secretary of State to the Pretender. He managed, however, to make his peace with the reigning family, and to have his property, though not his seat in the House of Lords, restored to him. Returning to England, he lived at Dawley, near Uxbridge, where he enjoyed the society of Pope, Swift, and other old literary and political friends, and in the *Craftsman* and in pamphlets bitterly attacked Sir Robert Walpole and his policy. B. never was able, however, to reappear on the scene of active political life. He died 12th December 1751. B. was twice married. His first wife was the daughter of Sir Henry Winchcombe. With her he did not live happily, and, on her death in 1718, he married the wealthy widow of the Marquis de Vilette. B.'s complete works were published by Mallet (1753–54, new ed. 8 vols. 1808–9). The best-known of these are his *Dissertation on Parties*, *Study of History*, in which he attacked Christianity, and *A Patriot King*. His style is singularly brilliant, witty, and emphatically rational. But for his religious opinions, and the general belief that he was unscrupulous and insincere, B.'s reputation would stand much higher than it does. It may, however, be safely affirmed that B.'s reputation stands higher to-day than it did at any period since his death. Few accurate readers of history would endorse the verdict of Lord Shelburne, first Marquis of Lansdowne, as given in his autobiography recently published, that he was 'all surface' and 'both a political and personal coward.' See B.'s *Correspondence* (Lond. 1793), and Macknight's *Biography of B.* (Lond. 1865).

Bol'ivar, **Y Ponte**, **Simon** (named *El Libertador*, 'the Liberator'), was born at Caracas, 24th July 1783. Having completed his education at Madrid, he applied himself diligently to the study of politics, and enlarged his experience by travel in Europe and the United States. Returning to his native country in 1810, he associated himself with the 'patriots' who sought to

establish the independence of the Spanish provinces in America. In 1811 he joined the standard of Miranda; and on August 4, 1813, at the head of an army of volunteers, he entered Caracas as a conqueror, having liberated the greater part of Venezuela from the domination of Spain. Being invested with supreme powers under the title of dictator, he prosecuted the war for some time with success; but having been defeated at La Puerta (June 14, 1814), and afterwards (17th August) at San Mateo, he retired to Jamaica, where he narrowly escaped assassination at the hands of an agent of the royalist party. In December 1816, he made himself master of the island of Margarita; the next two years were marked by brilliant successes; and in 1819 Venezuela and New Granada were united as a republic, under the title of Colombia, with B. as president. In 1822 B. aided in the liberation of Peru, and was made dictator, an office which he resigned, 1st January 1825, the country having been entirely freed from the enemy by the victory of Ayacucho of 9th December preceding. As a mark of gratitude, the Peruvians named the southern half of the new republic Bolivia (q. v.) in honour of the Liberator, and presented him with 1,000,000 dollars, with which he purchased the freedom of 1000 negro slaves. After having been confirmed twice in his presidency of Colombia, in 1826 and in 1828, he resigned it in January 1830, and died 10th December of the same year, at San Pedro, near Santa Marta, having failed in his object of uniting the whole of the S. American provinces into a gigantic republic. See Larrazabal's *Life of B.* (1867).

Bolivia, a republic on the W. side of S. America, between lat. 10° and 23° S. and long. 57° 30' and 70° 10' W. It is bounded W. by Peru and the Pacific, N. and E. by Brazil, and S. by the Plate provinces and Chili. Area, 536,180 sq. miles; pop. (1874) estimated at 2,000,000, of whom about one-seventh are Indians. B. is divided into nine departments, Chuquisaca or Sucre, Potosi, Oruro, Tarija, Cobija, La Paz, Santa Cruz, Trinidad, and Cochabamba. Nearly the whole country lies within the tropics, but not more than the half has a tropical climate, on account of its great elevation. The mountains belong to the range of the Andes (q. v.). Between two meridional parallel ridges of these lies the vast tableland known as the valley of the Desaguadero, which includes Lake Titicaca. The river system of B. is unique. On the W. of the Andes there is scarcely a river, while on the eastern side are found the sources of the Plata and the Amazon. Two circumstances explain this: on the western side the air is dry, while on the east, the Atlantic trade winds, that cross the S. American continent, are laden with vapour, and there is ample space for river development. The waters of the central plateau fall into Lake Titicaca, the overflow of which is carried off by the Desaguadero, which, after a course of 180 miles, loses itself in Lake Ullagas. The principal grain crops are maize, wheat, barley, and rye. The mineral wealth is great. Gold, copper, lead, and tin abound; and the silver-mines of Potosi were once the most productive in the world. Commerce is crippled for want of facilities of transport. Puerto-de-la-Mar, formerly Cobija, is now a free port, but the greater portion of the trade is done through the Peruvian ports of Tacua and Arica. A line of railway was nearly completed (1874) between Autogasta and Salar del Carmen, but the Rio Amazonas line into the interior has meanwhile (1876) been abandoned. The principal exports are guano, Jesuits' bark, copper, tin, and the precious metals; imports, iron, hardware, and silks. There are no reliable commercial returns, but the total imports are valued at £1,000,000, and the exports at something less.

B. declared its independence of Spain 6th August 1825, and was named after its liberator; but its subsequent history has not been more fortunate than that of other Spanish republics. The present (1876) president is Dr Thomas Frias, who was elected 14th February 1874.

Bolkhov, an ancient town of Russia, government of Orel, situated on the Nuga, 35 miles N. of the city of Orel. There are manufactures of gloves, hats, leather, &c., and trading in tallow, hemp, hides, &c. Pop. 18,491.

Boll, or **Bole**, a dry measure still occasionally used in Scotland for measuring potatoes, cereals, &c., and has the value of six bushels.

Boll'andists, the name given to those learned Jesuits who during the years 1643-1794 published at Antwerp, Brussels, and Tongerlo, the famous *Acta Sanctorum* (q. v.), a collection of the

lives of the saints of the Catholic Church. They received this name from Johann von Bolland (born in Limburg 13th August 1596, died 12th September 1665), who was the editor of the first five volumes. Among the numerous distinguished men who have edited or contributed to this colossal work, the most notable are Gottfried Henschen (born 1600, died 1681), Dan. Papebroek of Antwerp (died 1714), Konrad Janning (died 1723), Peter Bosch (died 1736), Suyskens (died 1771), Hubens (died 1782), Dom Anselmo Berthod (died 1788), and Jos. Ghesquière (died 1802). On the abolition of the Jesuit order in 1773, the B. found an asylum in the Augustinian Abbey of Candenberg in Brussels, where they continued their vast and laborious work until the persecutions of the 'enlightened philosopher,' Joseph II., brought about the dissolution of the learned society. In 1789 the Præmonstratensian Abbey of Tongerlo in Brabant undertook to complete the publication, but had only reached the fifty-third volume (6th October in the Calendar of Saints), when the French occupation of the Low Countries (1794) put a sudden end to their industry. In 1837 a new association of B. was formed in the old order, and several volumes have been issued since 1845, but the work is still unfinished. Those who desire to consult this great treasure-house of mediæval legend or history should get Palmé's volume of tables to the *Acta Sanctorum* (Par. 1875).

Bolo'gna (Lat. *Bononia*), one of the oldest and richest cities of Italy, capital of a province of the same name, lies at the foot of the Apennines, between the rivers Reno and Savena, 190 miles N.N.W. of Rome. It was long one of the most powerful cities in the Papal States, and is still the see of an archbishop and the seat of a prefect, of a general in command, and of a court of appeal. Adorned with numerous palaces and rich in art treasures, it is inhabited mainly by an aristocratic class, and is little disturbed by the bustle of trade. The houses are mostly three-storied, while the streets are broad, and the pathway is usually covered by arcades, which afford both shelter and shade. The two finest squares are the Piazza Maggiore del Gigante, or 'the Forum of the Middle Ages,' 395 feet long and 320 broad, surrounded by many splendid public buildings, and adorned with beautiful fountains (1563); and the extensive *Mea*, used as a military parade-ground. Among the most notable buildings of B. are the Palazzo del Podestà (1201), remarkable as the depository of the city archives, and as the prison (1249-72) of Enzius, son of the Emperor Friedrich II.; the Palazzo Pubblico, which has many splendid halls, as the Sala Farnese, and is adorned with beautiful frescoes and statuary; the cathedral (*il Duomo*), completed in its present form in 1748; the large church of San Petronio, on the floor of which is traced a meridian by Cassini (1653); the beautiful church of San Domenico, rich in monuments, and containing the tomb of St Dominic. There are some 130 other churches. B. has two extraordinary leaning towers, that of Asinelli (built by Gerard Asinelli, 1109), 256 feet high, with a lean of 3 feet 2 inches; and the Garisenda tower (1110), referred to by Dante (*Inferno*, 1st canto), which has a lean of 8 feet in an elevation of 130. About 3 miles from B. is the nunnery Madonna di San-Luca, towards which there runs a splendid colonnade of 654 arches. The *University of B.*, which claims to have been first founded by Theodosius the younger in 425, was founded anew by the famous Irnerius or Wernerus (died 1140), and subsequently gained a European reputation. Notable among its many celebrated professors have been several learned ladies, of whom three prelected respectively in the chairs of law, mathematics, and anatomy. In 1262 it had some 10,000 students, but though one of the best of Italian schools, it only now numbers some 600. The university library, of which Mezzofanti was for some time keeper, has some 200,000 volumes and 1000 MSS. Prince Marsigli here founded the *Institute delle Scienze* (1690), also an astronomical observatory, botanical garden, &c. Pope Clement XIII. instituted the *Accademia delle Belle Arti*, also called *Accademia Clementina*, which contains the masterpieces of the famous Bolognese school, formed in the 15th c. by the Caracci, Guido Reni, Domenichino Albano, and others. B. is the birthplace of the Popes Honorius II., Lucius II., Gregory XIII., Innocent IX., Gregory XV., and Benedict XIV. The manufactures are chiefly silks, velvets, jewellery, glass, artificial fruits and flowers, scented soap, liqueurs, macaroni, and the far-famed *cervelas* and *mortadello* sausages. Pop. (1872) 115,957.

B. is said to have been founded by the Etruscans under the name *Felina*. It passed into the hands of the Boian Gauls, and became a Roman colony B.C. 189, when it was first called *Bononia*. It was taken by the Lombards A.D. 728, but was made a free city by Charlemagne. B. received additional privileges from Heinrich V. in 1112, and soon rose to be the most flourishing republic of Italy. But after suffering from the party strife of the Guelphs and Ghibellines, it was united to the Papal See in 1513. Taken by the French in 1796, it was restored to the pope in 1815, again taken by the Austrians in 1849, and finally constituted itself a part of the Italian kingdom in 1860. See Savioli, *Annali della Città di B.* (3 vols. Bassano, 1788-95); Gatti, *Guida delle più rare Cose di B.* (Bolog. 1813); and Bädcker, *North Italy* (1875).

Bologna Phial, a small flask of unannealed glass, which stands a severe shock or blow on the outside without breaking, and flies into pieces immediately an angular bit of glass or flint is dropped into the interior. At glassworks the quality and colour of the pot metal is tested by blowing these phials, and their strange behaviour is accounted for by more rapid cooling on the outside than inside, and consequent unequal contraction.

Bolognese Stone, a variety of sulphate of barytes obtained from a bed of clay near Bologna, which is phosphorescent while heated with charcoal and exposed to sunlight. Sticks of 'Bolognese phosphorus' are made from it, by mixing the powdered mineral with gum.

Bolor-Tagh, a lofty tableland of Central Asia, also called the Pamir Steppe, stretches from the range of the Hindu Kush northwards to the Thian-Shan, and separates Turkestan into an eastern and western portion. It was long erroneously regarded as a mountain chain of the first magnitude.

Bols'na (anc. *Vulsinium*), a walled town in the province of Latium, Central Italy, on the N. shore of the lake of the same name, 20 miles N.N.W. of Viterbo. It was in ancient times one of the twelve famous Etruscan towns, and was taken and destroyed (280 B.C.) by the Romans, who here built a city of which there are still numerous remains. B. is celebrated for its wine. Pop. 2100. The malarious *Lago di B.* (anc. *Lacus Vulsiniensis*) is 9 miles long and 8 broad, and contains the islands Martana and Bisentina, where Pope Leo X. resided during the autumn months, and where the Farnesé family built a castle and a church, of which the tower still exists.

Bolsward (Lat. *Bolverda*), a town of the Netherlands, in the province of Friesland, and 15 miles S.W. of Leuwarden. It is surrounded by an earthen wall and a canal, and has a splendid Gothic church, a grammar school, and several benevolent institutions. The principal industries are shipbuilding, tanning, worsted-spinning, and wool-carding, brickmaking, and the manufacture of coarse pottery. There is a trade in butter, cheese, and cattle. Pop. (1870) 4630.

Bolt, a piece of metal (generally iron), with a screw cut on it, used in connection with a 'nut,' which has a corresponding internal screw, to fasten together the parts of structures or machines.

Bol'ton, or **Bolton-le-Moors**, a flourishing town of S. Lancashire, and one of the chief seats of the cotton manufacture, on the Croal, 11 miles N.W. of Manchester by rail. It contains about 80 mills, with some 2½ millions of spindles, and produces chiefly plain and fancy muslins, fine calicoes, dimities, quiltings, and counterpanes. Many of the modern improvements in manufacture originated here. Arkwright resided at B., and Samuel Crompton was born in the parish. There are also in B. more than 40 foundries and ironworks, and extensive dye-works and bleachfields. In the time of Henry VIII. B. was noted for its woollen industry, introduced by Flemish clothiers in the 14th c. The town was garrisoned during the civil war, and in 1644 was stormed by the Earl of Derby, who was beheaded here after the battle of Worcester. Near it are many coal-mines. It returns two members to Parliament. Pop. (1871) 92,655.

Bolt-Rope, the rope sewn along the borders of sails to strengthen the canvas. It is a *leach-rope* up the sides of a sail; along the top, a *head-rope*; and a *foot-rope* at the bottom.

Bo'lus, a round semi-solid mass of some medicine intended to be swallowed at once. It differs from a pill in being much larger and generally also less solid.

Bo'ly, or **Bo'li**, a town of Asia Minor, in the vilayet of Kashamuni, on the caravan route between Constantinople and Erzeroum. Standing on the left bank of a river of the same name, it occupies an eminence, supposed to be the site of the Roman Hadrianopolis. B. has several mosques; and near the town there are mineral springs and much-frequented baths. Pop. 5000.

Bo'marsund. See **ALAND ISLANDS**.

Bomb, a hollow spherical projectile fired from a Mortar (q. v.), and fitted with a fuze to explode the charge of gunpowder which bursts within the shell. Bombs are chiefly employed in vertical fire (that is, they are fired from the mortar at an angle of 45°, and fall vertically), to destroy earthworks, &c., or in bombarding towns; in horizontal fire they are most destructive against troops or shipping. The maximum diameter of spherical shell of this kind in use in the British army is 13 inches, and such are calculated to penetrate earth to 6 feet, and brick-work or concrete to 1½ feet, before exploding.

Bom'ba (It. *bomba*, a bombshell), the name applied to Ferdinand II., king of the Two Sicilies, to mark the scorn with which he was universally regarded for his merciless bombardments of Messina during the war of 1848.

Bomba'ceæ. See **STERCULIACEÆ**.

Bom'bard, an obsolete kind of cannon, very short and thick, with a wide bore, from which were projected large stones. Some bombards in the 15th c. hurled through the air stones of from 200 to 500 lbs. weight.

Bombardier, an artilleryman whose duties are to load shells and grenades, to make and fix the fuzes, and who is particularly appointed, on the field or at sieges, to the service of mortars and howitzers. A certain number of these non-commissioned officers are attached to every company of artillery.

Bombardier Beetle, the popular name applied to beetles belonging to the genera *Brachinus* and *Aptinus*, from their habit of ejecting a fluid, of a pungent irritating odour, from their abdomens when irritated. These beetles belong to the *Pentamerous* section of the Coleoptera, and are included in the family Carabidæ. The liquid thus discharged changes vegetable blue to red, and ultimately produces a yellow stain. When brought in contact with mucous membrane of the tongue it produces a smarting sensation. Several very small species of these beetles occur in Britain; the larger species are tropical in their distribution. The *Aptini* want membranous wings, whilst the *Brachini* possess both *elytra* and membranous wings. *B. crepitans* and *B. displosor* are familiar species.

Bombard'ment, throwing shells, red-hot shot, rockets, carcasses, and other destructive missiles into a tower or fort, to destroy property, and terrify or kill the people, with the view of compelling the military defenders to yield up the place. It is a cruel operation, and is resorted to in modern times mainly as an adjunct to a regular siege, or to punish the inhabitants of some seaport town, when the B. is inflicted by ships of war. Odessa was bombarded by the allied fleets of Great Britain and France in 1854. The most celebrated bombardments on record are those of Gibraltar, Copenhagen, Algiers, Sebastopol, and Paris. It was estimated that for a time, in January 1871, 20,000 shells were hurled daily at the forts and city of Paris. The distance from which these shells, weighing on an average 80 kilogrammes, or over 1½ cwt., were sent, and the precision with which they were aimed, surpassed anything of the kind the world had ever seen.

Bombard'on, a bass brass instrument of the Bugle class (q. v.), used in military bands.

Bom'baz. See **SILK COTTON TREE**.

Bom'bay, Province of, formerly the most important division of British India, occupying the N.W. coast region, extends from Mysore in the S. to Beloochistan and the Punjab in the N., and is bounded W. by the Indian Ocean, and E. by Raj

putana, the Central Province, Berar, and the territories of the Nizam and Indore. Area, 188,195 sq. miles, of which 63,253 are in native states; pop. (1872) 25,624,696, including the native pop. of 9,272,073. It presents great diversity of physical aspect—high tablelands, fertile valleys, rugged mountains, and sterile plains—and is naturally divided into four parts: (1) the N. and S. Concan, which lie between the Western Ghâts and the sea, and are fertilised by the vapours of the S.W. monsoons; (2) the dry tract beyond the Western Ghâts, comprising the divisions Kaira, Khandesh, Nasik, Ahmednuggar, Belgaum, and Kaladgi; (3) to the N. of these, the rich alluvial region about the mouths of the Tapti and Nerbudda; and (4) still further N., the detached territory of Sindh (q. v.). For administrative purposes, B. is separated into a Northern and a Southern Division, with nineteen executive districts, while Sindh forms a subordinate province by itself. The only foreign possessions within the limits of B. are the Portuguese Goa, Damaun, and Diu. The principal rivers are the Nerbudda, Tapti, Mahi, and Sabarmati, entering the Gulf of Cambay; the Indus in Sindh; and the Godavari and Krishna, which flow into the Bay of Bengal. There are few lakes, the chief being the Munchur, and the amphibious Runn of Kutch. B. and Poona cities are supplied with water by the vast artificial basins of Veihar and Karak-wala. The climate varies greatly over so wide an area, but is generally more healthy than in the other provinces. Along the coast the rainfall ranges from 70 to 300 inches, and in some parts of the Concan a temperature of 117° F. is experienced. A great part of B. is covered with forest, and among the existing wild animals are tigers, lions, elephants, leopards, hyenas, wild boars, and a vast variety of serpents. In 1873, some 2334 deaths were caused by the bites of snakes and other wild animals. Agriculture is making rapid progress, the number of agriculturists returned in 1872 being 3,835,163, and the chief products are cotton, rice, tobacco, opium, wheat, barley, and various other grains. The system of land revenue administration brings each ryot into direct relation with Government, and is fruitful in precise statistics. Cotton, which was introduced from America, is also indigenous, and in 1872-73 was cultivated over an area of 1,502,523 acres, while 46,735 acres were under tobacco, of which the export exceeds 3,000,000 lbs., and 1,377,464 were under rice. In all 21,852,974 acres were under crops. There are extensive manufactures of cotton cloths and yarns, and a considerable amount of dyeing and cotton printing. Other manufactures are silks, cloth of gold and silver, woollens, leather, paper, pottery, native cutlery, gold, silver, and ivory ornaments, and lacquered furniture. The salt manufacture, yielding (1872-73) a duty of £628,722, is partly in the hands of the Government, to which belong the Gujerat Salt Works, opened in 1873. The famous opium of Malwa, in passing through B., yielded (1872-73) a duty of £2,612,520. The industries of B. generally received a vast impulse from the opening of the three great lines of railway to Madras, Baroda, and Calcutta. Many extensive public works have been recently completed, the most important being the Krishna Canal, while great improvements are being effected in the means of irrigation.

In 1661, the island of B., the nucleus of the present territory, became a British possession, and in 1668 it was granted to the East India Company, being made, in place of Surat, their chief presidency. For nearly a century its dominion remained unextended, but within comparatively late years it has been rapidly increased, chiefly by the annexation of Mahratta country. Its administration is under the control of the Governor-general of India in council, and consists of a governor and three councillors. The annual revenue is some £10,000,000; expenditure, £9,000,000, the surplus going to the Indian imperial charges. In 1871-72 the army was 39,270 strong, with 1332 European officers, embracing 26,764 native troops. B. has now only a small local marine. The pop. of B. comprises 12,440,650 Hindus, 2,847,756 Mohammedans, 192,245 Buddhists, 106,133 Christians, 67,115 Parsees, and 603,836 aborigines. The Church of England is here represented by a bishop, an archdeacon, and a small body of chaplains, while there are also numerous denominational missions. Education is now receiving great attention, there being (1872-73) as many as 3595 vernacular schools, attended by 182,147 pupils; 176 middle-class schools, with 16,612 pupils; 41 high-class schools, where 7167 pupils were being trained for the six colleges affiliated with the university. The University of B., based on a system of examina-

tion similar to that of London University, was opened by Lord Elphinstone in 1857. In 1872, there were 909 candidates, of whom 378 passed. In B. there are four languages widely spoken, Marathi, Gujarathi, Canarese, and Sindi; and of 52 native newspapers, 28 belong to the first, and 23 to the second of these, while there is one in Hindustani. Considerable intellectual activity is shown by the appearance (1872) of 124 poetical works, and of 61 religious and 16 legal publications. See official *Statement of the Moral and Material Progress and Condition of India*, by Clements R. Markham (Lond. 1874); *Annals of Indian Administration for 1872-73*, edited by Dr George Smith (Seram. 1874).

Bom'bay (named after an Indian goddess, *Bombê*, and translated by the Portuguese into *Bom Bahia*, good bay), formerly an island of India off the coast of the Concan, but now connected by causeway with the mainland, and included in the province of the same name, in about lat. 18° 57' N. and long. 72° 52' E. It is traversed by a deep valley, and has a good climate, but its productions are insignificant. Area, 18.62 sq. miles; pop. (1872) 644,405, including the old fort or city portion of B., which occupies the S. of the island. As early as 1530 the Portuguese possessed the whole of B., which they ceded to the English (1661) on the marriage of Charles II. with the Infanta Catherine. Between the island and the mainland there is a splendid bay, accessible to shipping even during the S.W. monsoons. There are several islets in close proximity to that of B., of which the chief are Salsette, containing the reservoir of Veihar, constructed in 1856-60, Caranja, Elephanta, famous for its rock-cut temples, and Old Woman's Isle.

Bom'bay, the capital of the province of the same name, is practically co-extensive with what was the island of B., and, next to Calcutta, has the greatest trade of any port in India. It is divided into a European and a native town, which lie apart about three-quarters of a mile, and the space between them is occupied by the railway termini, several factories, and the barracks and esplanade. The principal public buildings are the Town-hall, the Secretariat, the Custom-house, the Mint, the Public Works Office, the Post-office, the University, the Elphinstone College, the Grant Medical College, the School of Arts, the cathedral, the mission colleges, the two Jamsetjee hospitals, and the governor's official residences at Parell and Malabar Point. About a century ago B. was one of the unhealthiest, but is now one of the healthiest, of Indian cities. It has an efficient sanitary system, and the death-rate for the five years ending 1872 was 25.45 per thousand. There is here a Chamber of Commerce and a Geographical Society, founded in 1830, and united in 1873 to the B. branch of the Royal Asiatic Society, which publishes a *Journal of Transactions*, and to which belongs a valuable library. The Victoria and Albert Museum, of which Sir Bartle Frere laid the foundation in 1862, together with an extensive botanical garden, was opened in 1871. There are also numerous commercial and insurance offices, and many banks, of which the chief are the new Bank of Bombay, and the Bank of Bengal's branch. In 1872-73 the Elphinstone College was attended by 184 students, of whom 45 were Brahmins. To the S.E. of the European town is the harbour, placed under the B. Port Trust by Act 1873, with docks extending over some 200 acres. The large new Sassoon dock (so called after the eminent Jew) was opened in 1875. The principal industries of B. are shipbuilding, extensively carried on by the Parsees, and the manufacture and printing of cotton. In the city and throughout the island there are 13 steam cotton-mills, employing 848 looms and 60,000 spindles, and producing 100,000 lbs. of yarn daily. Besides unrivalled harbour accommodation, B. has a splendid commercial position, especially since the opening of the Suez Canal, and does nearly one-third of the trade of India. In 1873 the exports, including treasure, were £21,573,829; the imports, £13,676,002. Among the articles of export are cotton, opium, shawls, coffee, ivory, gums, pepper, and tobacco. The Indian mails are sent to B., from whence letters are despatched by railway to Madras, the N.W. Province, Punjab, and Calcutta. Pop. (1872) 644,405, of whom 408,680 are Hindus, divided into 56 castes; 21.3 per cent. are Mohammedans; 43,945 are Parsees; 23,534 Indo-Portuguese; and 4796 British born. There are an immense variety of languages spoken in B., of which the chief are those of the province, or Marathi and Gujarathi; all those of the Punjab, the N.W. Province, and Rajpootana; most of the

Aryan family connected with Bengal and Orissa; all the leading Dravidian languages of Madras; Arabic, Turkish, Persian, Hebrew, Burmese, Malay, Chinese; several European languages, as English and Portuguese; and most of the languages of the E. coast of Africa, as Sowahili, Somali, Galla, &c. The Parsees, descendants of the Persian fire-worshippers, used to be the richest and most influential of the native citizens, till the collapse of the speculation caused by the American civil war in 1866. The Hindus, including Jains, have since gained on the Parsees. The principal Hindu is Sir Munguldass Nathooobhoy, K.C.S.I., and the leading Parsee is Sir Jamsetjee Jejeebhoy, Bart. From 1829 till his death in December 1875, the Rev. Dr John Wilson, F.R.S., was, as missionary, scholar, and citizen, identified with all progress in B. The late Dr Buist also was long a distinguished savan, writer, and philanthropist in this city. See GUERRES and PARSEES.

Bom'bay Army. See INDIA (EAST) ARMY.

Bom'bay Duok', the name given to a Teleostean fish (*Saurus ophiodon*), generally regarded as belonging to the family *Scopelidae*, which resemble the salmon, and possess a small soft second dorsal fin. The edge of the upper jaw, however, is formed in the *Scopelidae* by the intermaxillary bones. The pylorus possesses caeca, and an Air-bladder (q. v.) is generally wanting. The B. D. inhabits the seas round the Indian coasts, particularly near Bombay and Malabar. Its flesh is highly esteemed, and is variously prepared and preserved, and even imported into this country as a relish. It is also known in commerce by the name *Bummaloiti*. Its body is elongated. The mouth is very large, and provided with numerous small teeth.

Bombazine' (*Bombax*, the silkworm), a textile fabric having a silk warp and a woollen weft, mostly made of a black colour, and used for mourning dress.

Bomb'-Proof Buildings, in fortification, are erections of masonry sufficiently strong to resist the penetrative power of bombs or shells falling from a great height. Permanent buildings of this kind are called *Casemates* (q. v.); temporary erections, *blindages*.

Bom'byx. See SILKWORM.

Bom Jardim ('good garden'), a town in the centre of a very rich district in the province of Bahia, Brazil, situated on the river San Francisco, 155 miles due N. of Rio Janeiro. Pop. 6000.

Bom'mel, or **Zalt-Bommel**, a prettily-built town, at one time a fortress, in the province of Gelderland, Holland, on the Waal, here crossed by a railway bridge, 20 miles S. by W. from Utrecht. Pop. (1870) 4162, engaged in the manufacture of iron utensils, leather, and soap, and trading chiefly in the produce of the field.

The Bommelerwaard ('Bommel-meadow') is a district in the same province, 16 miles long by 6 broad, bounded by the rivers Waal and Maas, and forming all but an island. It is defended on the E. by Fort St Andrie, and on the W. by Fort Loevenstein, and has a population of about 15,000, chiefly engaged in agriculture. The St Andrie's Canal, at the E. end, has been done away with by the erection of a dam, and so one cause of the great inundations has been removed.

Bona (Fr. *Bône*; Arab. *Beled-el-Arab*), a seaport in the province of Constantine, Algeria, beautifully situated near the mouth of the Sebus, on a bay of the Mediterranean, at the base of a hill. It occupies the site of the ancient *Aphrodisium*, and near it are some remains of the famous Hippo Regius, a residence of the Numidian kings and the see of St Augustine. B. is walled round, and further defended by Fort Cigogne. There is a growing trade in hides, wool, corn, tobacco, cork, bark, ironstone, and coral. Near B. are iron and copper mines, the former employing 1200 workers. The town communicates with Marseille by telegraphic cable, laid in 1870, and a railway to the mines of Ain-Mokra is (1875) in course of construction. Pop. (1872) 16,196.

Bona (Lat. 'goods') is a term sometimes used in English law to denote personal estate. Thus, *B. confiscata* means forfeited goods; *B. notabilia*, goods of a certain value; *B. bucantier*, stray goods, such as wrecks, treasure trove, &c.

Bona De'a ('the good goddess'), a Roman divinity, described as the sister, wife, or daughter of Faunus. Her worship was confined to women. Her festival was celebrated yearly on the 1st of May, and at night, in the house of the consul or prætor, and was conducted by the Vestals, and while it lasted no male was allowed to be in the house. The wine used in the solemnities was called milk, and the vessel holding it *mellarium*. The goddess was supposed to possess healing powers, in token of which the serpent was her symbol.

Bona Fides. In law, a possessor in *bona fide* is one who believes that he has a good legal title to that which he possesses. B. F. ends when the possessor becomes aware, by private knowledge or otherwise, that his title is insufficient. When the question of right is one of difficulty, the interruption of the B. F. may not be held to have taken place until after litigation; perhaps even not until final decree in the action. The legal effect of being held as acting in *bona fide* is most important.

Bonald, Louis Gabriel Ambroise Vicomte de, a politico-religious philosopher and statesman, born at Monna, near Milhaud, in Rouergue, 2d October 1753, emigrated at the revolution of 1789, and wrote at Heidelberg in 1796 his *Théorie du Pouvoir Civil et Religieux*, which was suppressed by the French Directory because it advocated the restoration of the Bourbons. B., however, returned to France, was associated with Chateaubriand on the *Mercur*, and placed in the department of Public Instruction by Napoleon. In the Chamber of Deputies, under the restoration, he pled for a censorship of the press, the abolition of divorce, and the restoration of Church lands. He was made a peer in 1823, but disappeared from public life at the revolution of 1830, and died 23d November 1840. B.'s principal work is *La Législation Primitive*, which appeared in 1802 (2d ed. 1821). In this he bases the right to govern on the will of God, supernaturally revealed in the gift of language, and preserved by the Bible and the Church. He reduces everything to the categories of cause, mean, and effect (e.g., God, Mediator, man; Church, clergy, laity; king, nobility, people; father, mother, child), and argues that the same relation exists between the cause and the mean as between the mean and the effect. Although based on verbal analogies, B.'s system was regarded by the Catholic Conservatives of the restoration as their main stay in philosophy. He has been classed with De Maistre and De la Mennais in the theocratic school of sociology. See B.'s *Œuvres Complètes* (Par. 10 vols. 1817-19).

Bon'aparte, Family of, appears as early as the 13th c. (according to some historians as early as the 10th c.), in Italian history. One branch settled in Ajaccio, Corsica; and in the 18th c. its representatives were Lucien B., an archdeacon, Napoleon B., and their nephew Charles. Charles B., father of the Emperor Napoleon, was born March 29, 1746, and in 1767 married a beautiful patrician, Letizia Ramolino. At first he espoused the cause of Paoli in the struggle for Corsican independence, but ultimately, thinking it hopeless, took the French side; became assessor of the town and province of Ajaccio, and in 1777 was one of a deputation of Corsican nobles sent to the French court. He took advantage of this visit to get his son Napoleon admitted into the military school of Brienne. Charles B., who seems to have been a very amiable man, died at Montpellier of cancer in the stomach, February 24, 1785. His family consisted of eight children—Joseph B., king of Spain; Napoleon (q. v.), Emperor of the French; Lucien B., Prince of Canino; Maria Anna (afterwards Elise); Louis B., king of Holland; Carlotta (afterwards Marie Pauline), Princess Borghese; Annunziata (afterwards Caroline), wife of Murat, king of Naples; Jerome B., king of Naples. These, with the children of Beauharnais, became the *Napoleonidae*—the Emperor, by advice of the senate, November 6, 1804, confirming the right of succession to his own heirs and those of Joseph and Louis—Lucien and Jerome being excluded on account of their marriages. A brief sketch of the more important of the *Napoleonidae*, not separately treated, may be here given.

MARIA LETIZIA RAMOLINO B., mother of Napoleon I., was born August 24, 1750. On her son's accession to the dignity of First Consul, she went to Paris; and when he became Emperor in 1804, she was known as Madame Mère. After his downfall, Letizia, who seems to have been prepared for that event, lived with her stepbrother, Cardinal Fesch, and died February 2, 1836, leaving considerable property.

JOSEPH B., eldest brother of Napoleon, born at Corte, Corsica, January 7, 1768, first obtained prominence when, in 1800, he was sent by his brother, then First Consul, as plenipotentiary to the United States. Joseph, who was an intelligent and amiable man, stuck by his brother from first to last, and the latter seems to have loved him alone of his family. In 1805 he was made ruler of the Two Sicilies, in 1806 king of Naples, and in 1808 king of Spain. In the last position he was unfortunate, and after the defeat of Vittoria returned to France. After some hesitation, in 1813 he allowed his brother to recognise Ferdinand VII. as king of Spain. After Waterloo, he tried to aid his brother to escape to the United States, and when the latter resolved to trust himself to the English Government, crossed the Atlantic himself, remaining in America till 1832, when he came to England. In 1841 he was permitted to go to Italy to reside with his wife. He died at Florence, July 28, 1844. His wife, Julie Marie Clary, born December 26, 1777, died April 7, 1845, was the daughter of a citizen of Marseille, and sister-in-law of Bernadotte, who became king of Sweden. She had two daughters, Zenaïde Charlotte Julie B. (born July 8, 1801), who became the wife of Lucien B.'s son, the Prince of Canino, and Charlotte Napoléone (born October 31, 1802, died October 31, 1839), who married Louis Napoleon, second son of Louis B., king of Holland (died 1831).

LUCIEN B., second brother of Napoleon, was born at Ajaccio, 21st May 1775. He was a man of very considerable ability and decision of character, and, before his brother's ambition developed itself, was a keen republican. He aided his brother in his aspiration after the office of First Consul, and was the hero of the 18th Brumaire, but differing from Napoleon, who wished him to divorce his second wife, and offered him the crowns of Spain and Italy, he retired to his estate of Canino in Tuscany, devoting himself to literature and art. Sailing for America in 1810, he was captured by the English. After his brother's downfall, he returned to Rome. He made a brief appearance in French politics in 1815, but finally retired to Italy, and died at Viterbo, June 30, 1840. Lucien made various unsuccessful attempts to obtain a literary reputation, having composed, among other poems, a forgotten epic entitled *Charlemagne, ou l'Eglise Déliée* (1814). He was twice married, first, in 1795, to Christine Boyer, daughter of a citizen of St Maximin, and secondly, in 1803, to the widow of a stockbroker, Madame Joubertion, who survived him. By his first marriage he had a daughter; by his second, nine children, of whom his eldest son, **LUCIEN JULES CHARLES B.** (born May 24, 1803, died July 29, 1857), displayed in a high degree the parental love of literature and science, and reached distinction as an ornithologist.

LOUIS B., third brother of Napoleon I., was born September 2, 1778. He was made king of Holland in 1806, but was never popular, although he was sufficiently noble not to attempt to enrich himself at the expense of his subjects, and to refuse the throne of Spain. His later years were spent in Italy, and he died at Livorno, July 15, 1846. Louis had the family taste for literature, and wrote some political and historical treatises. His wife, Hortense Eugénie Beauharnais, the adopted daughter of Napoleon, was born at Paris, April 10, 1783. Naturally an amiable woman, she lived unhappily with, and was finally separated from, her husband, for whom, to please Napoleon, she rejected her lover, Général Desaix. She died at Arenenberg in Switzerland, October 3, 1837, and her remains were placed near those of her mother Josephine at Rueil, near Paris. She wrote several songs, including the patriotic *Partant pour la Syrie*, and also the book, *La Reine Hortense en Italie, en France, et en Angleterre pendant l'année 1831*. She had three sons, the two eldest of whom, Napoleon Louis Charles and Louis Napoleon, died in 1807 and 1831 respectively. The third, Charles Louis Napoleon, became Emperor of the French under the title Napoleon III. (q. v.).

JÉRÔME B., youngest brother of Napoleon, was born at Ajaccio, November 15, 1784, and educated for the navy. During the war between France and England in 1803, Jerome lived in the United States, where he married Elizabeth Patterson, daughter of a Baltimore merchant. By his brother he was made king of Westphalia (1807), in which position he did nothing but live in pomp and spend money. He fell with Napoleon after the battle of Leipzig, but reappeared in public during the Hundred Days, and fought for his brother at Ligny and Waterloo, in 1815. He then went to Florence, but in time

was allowed to return to France, and was even made a marshal in 1850. On his accession to the throne of Westphalia, Jerome was compelled to divorce his American wife, and to marry Sophia Dorothea, the daughter of the King of Württemberg. He died at Villegienis, near Paris, June 24, 1860. His *Mémoires et Correspondance du Roi Jérôme et de la Reine Catherine* was published at Paris in 5 vols. (1861-64). By his first wife he had one son in America, and by his second three children, one daughter and two sons. The elder of the sons, Jerome, was born August 24, 1814, and died 1847. For an account of the latter, Napoleon Charles Paul B., born September 9, 1822, see **NAPOLÉON, PRINCE**. The daughter, Mathilde Letitia Wilhelmine B., born at Trieste, May 27, 1820, married Anatol Demidoff, Prince of San-Donato, in 1841, separated from him in 1845, and lived subsequently in Paris. At the court of Napoleon III. she did the honours up till the date of the Emperor's marriage. For an account of Jerome's American wife, see *Didier's Life and Letters of Mde. Bonaparte* (Lond. 1879). The chief works on the history of the Bonaparte family are *Famiglia Buonaparte del 1183 al 1834* (Naples, 1840); *Storia Genealogica della Famiglia Buonaparte* (Flor. 1847); *Le Antichità dei Bonaparte*, by F. Stefani and L. Baretta (Ven. 1857), and *Origine des Bonapartes* (Tur. 1859).

BONASIA, a genus of Rasorial birds belonging to the family *Tetraonidae* or grouse, represented by the European hazel-grouse or Gelinotte (*B. Europæus*), and by the ruffed grouse (*B. umbellus*) of America—the 'pheasant' of the United States. These birds are nearly related to the true grouse (genus *Tetrao*), but possess the shank and toes destitute of feathers, and the feathers of the upper part of the head are elongated. The hazel-grouse occurs throughout Europe from the N. in Siberia to the extreme S., but is absent from Britain. It is also found throughout Africa. It averages the common partridge in size, and is coloured grey and reddish brown, with a black stripe near the end of the side feathers of the tail. The flesh is highly esteemed in Germany and elsewhere. It inhabits wooded districts. The eggs vary from ten to eighteen in number. The ruffed grouse of America averages 18 inches in length, and is plentiful throughout the United States of America, but especially abounds in hilly districts. A tuft of brown or black feathers situated on each side of the neck, and which can be erected at will, has procured for this ~~genus~~ the name of ruffed grouse. At the breeding season the polygamous males call the females with a *drumming* noise made by clapping the wings forcibly. The flesh of these birds is much esteemed in America. The eggs vary from four or five to twelve in number, the nest being generally formed on the ground, and under the shelter of a bush or shrub.

BONASUS, or **BONASSUS**. See **BISON**.

Bonaventura, St., originally **Giovanni di Fidanza**, a famous theologian and schoolman, was born at Bagnorea, in Tuscany, in 1221. In 1248 he entered the order of St Francis; in 1253 he obtained a chair of Theology in Paris; in 1256 he became General of his order, which he governed with equal zeal and prudence. After the death of Clement IV. in 1268, the see of Rome remained vacant for nearly three years, the cardinals being unable to agree on a successor. B. reconciled their differences, and prevailed on them to give a unanimous vote in favour of Tedaldus Visconti, Gregory X., who, in token of his gratitude, conferred on him the bishopric of Albano, and whom he accompanied to the Council of Lyon, at which town he died, July 15, 1274, while engaged in the work of the council. B., who enjoyed even while living a high character for sanctity, was shortly after his death assigned by Dante a place among the saints of paradise, and was canonised in 1482. Sixtus V. classed him as the sixth of the great doctors of the Church. B. ranks as the greatest philosopher of his order, and the Franciscans proudly maintain his merits against those of the scholastic chief of the Dominicans, Thomas Aquinas (q. v.). Many of his thoughts are at once sublime and mystical, the product of a strong imagination and an ardent faith; and one of his most characteristic works, the *Reductio Artium in Theologiam*, displays in its very title the drift of all his thought. B. was a pure mediævalist, in whom no trace of modern thought is visible, as it is, for example, in Abelard. The worship of the Virgin, the celibacy of the priesthood, transubstantiation, communion in one kind, the rules of monastic life, these are the favourite themes on which his genius spent its force. His collected works were published at Rome in 7 vols. fol. (1588-96). Many of these, however, are apocryphal.

such as the *Psalter of Mary*. He was known among his contemporaries as the *Seraphic Doctor*.

Bona Vista, a bay and cape on the E. coast of Newfoundland, also the chief town of a district of the same name on the bay, and one of the oldest settlements in the colony. Pop. (1871) 2600.

Bon'champ, Charles Melchior Artus, Marquis de, a Vendean general, born at Jouverdeil, in Anjou, 10th May 1760. He was a captain in the French service when the Revolution broke out, but being a fervid royalist, he withdrew to a chateau near Saint Florent. The Vendean insurgents chose him for their leader; and after defeating the republicans in several engagements, he was mortally wounded before Chollet, October 17, 1793. He died the following day, not, however, before having prevailed on his troops to spare 5000 republican prisoners who had fallen into their hands. See Chauveau and P. Dussieux, *Vie de B.* (Par. 1817).

Bond, in brickwork, is the method of laying bricks so that the vertical joints in adjacent courses may not occur immediately over each other, and so that by placing some bricks with their length across the wall (*headers*), and others with their length parallel to its face (*stretchers*), the wall may have the greatest attainable stability in both directions. Special arrangements of headers and stretchers have received the names English B., Flemish B., &c., for which see BRICKLAYING.

Bond is, in law, a legal instrument, by which one person becomes bound to another for the payment of money, or for the performance of some act. The general conditions which attach to the validity of all contracts attach to that of a B. Thus an infant or a lunatic cannot bind himself by a B., and a B. by a married woman is null. But a B. in favour of an infant, a lunatic, or a married woman is valid. There are also special points of law regarding the validity of a B. It need not generally be technically worded, but it must not be ambiguous. Due legal execution is necessary. It is of non-effect until delivered. In Scotch law, the deed constituting the security, analogous to Mortgage (q. v.) in England, is called a heritable B., or B. and disposition in security—the latter being the more modern form of deed. It is a B. for a sum of money, with a conveyance of real estate in security to the lender. It stipulates for rate and dates of payment of interest. Being placed on the records, it constitutes a security valid against creditors. In a competition between two or more holders of a B. over the same subject, preference is given, not according to priority of date of B., but according to priority in date of placing on record. See RECORDS.

Bond of Caution.—See CAUTION.

Bond for a Cash-Credit in a Bank.—The cash-credit is an arrangement peculiar to Scotch banking. Under it, on satisfactory security given to the bank, a person is permitted to draw to a certain amount agreed upon, for which, with the interest that may fall due on the daily balances, security is given. This security is called as above, or simply a cash-credit B. It may be either heritable or personal.

Bonds of Bottomry and Respondentia.—See BOTTOMRY.

Bonded Warehouse.—This institution was first authorised by Act of Parliament in 1802. Various Acts regarding its arrangements have since been passed, the whole having been embodied in the Customs' Consolidation Act of 1853. The immediate payment of duty on articles imported was found to press heavily on the merchant, as he got no return for it until his goods reached the retail dealer, and his purchasing power was thus crippled. Hence the system conducted through the B. W. was adopted. The Commissioners of the Customs, under direction of the Treasury, may appoint warehouses or places of security, in which goods may be deposited, without payment of duty, until it suits the owners to remove them, the warehouse-keeper or the importer giving a B. for the payment of the duties on withdrawal of the goods. Any importer or proprietor fraudulently getting access to the warehouse, without the proper officer, forfeits £500. Goods must be removed and duty paid within three years; ship-stores within one. Right of property to goods in B. is transferred by what are called Dock-Warrants (q. v.). Goods in B. W. may be legally regarded as *in transitu*; hence very nice questions of law often arise regarding them.

Bon'di, Clemente, an Italian poet, born at Mizzano, Parma, in 1742, entered the order of Jesuits, and while still young be-

came Professor of Rhetoric in the Seminary at Parma. An ode on the suppression of the order having subjected him to the resentment of the Spanish court, he concealed himself in the Austrian Tyrol. B. died at Vienna, June 21, 1821. His poems are especial favourites with the ladies of Italy, from the noble simplicity of the style and the easy elegance of the versification. His version of the *Æneid* (Parm. 1797) is also much esteemed. A complete edition of his works (3 vols. sm. 4to) was published at Vienna in 1808. Separate productions are *La Conversazione* (Ven. 1783), *La Felicità* (Mil. 1797), &c.

Bondu', or **Bondou**, a Fellatah state in Senegambia, West Africa, with an estimated pop. of 1,500,000, extending in lat. 14°-15° N. and long. 11°-13° W. It is a dependency of France, and exports corn, gums, indigo, tobacco, and gold-dust. The country is in part hilly, with a healthy climate, and is bounded on the E. by the river Falemé. A large proportion of the inhabitants are slaves, and the religion is a corrupt form of Mohammedanism. The capital is Bulibani, a collection of miserable huts, surrounded by mud walls, situated on the left bank of the Falemé, with a pop. of about 2200.

Bone forms the framework of all vertebrate animals. The various bones, when united together, constitute the Skeleton (q. v.), support the animal, and are the passive instruments of locomotion. They maintain the shape of the body, give attachment to the soft parts, and form cavities for the protection of the more important vital organs. Being jointed together, they serve as levers for effecting the various movements of the body.

B. is one of the hardest structures of the body, but it also possesses an amount of elasticity and toughness. The ribs are the most elastic bones. B. in the living body is somewhat pink in colour, and is nearly but not quite twice as heavy as water. Bones differ much in shape and size, and hence anatomists have divided bones into four classes, according to their form.

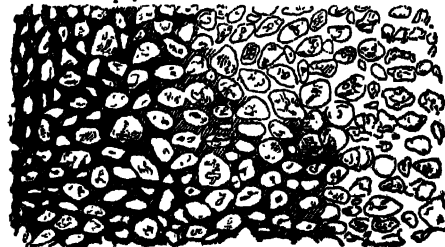
1. **Long Bones**.—These are chiefly the limbs. The Collar-B. (q. v.) is also a long B. Long bones consist of a shaft and two ends or heads. The shaft is composed of dense texture, and has a hollow canal internally filled with marrow. The two ends or extremities are generally more or less expanded, are composed of spongy tissue, and have their surfaces covered with a smooth cartilage for the purpose of articulating with neighbouring bones to form joints.

2. **Short Bones**, sometimes called round bones, are found in the wrist and ankle. They are firmly bound together by fibrous tissue, and the movements of the joints formed by them are very limited.

3. **Flat Bones**.—These bones are composed of two layers of compact tissue enclosing between them a variable amount of cancellated texture. The bones of the cranium, which form the roof and sides of the skull, the lower jaw, the ribs, and the shoulder-blade, are examples of flat bones.

4. **Irregular Bones**, sometimes called mixed bones. These cannot be included under any of the other heads on account of their form; they are generally situated in the middle line of the body. The vertebrae and certain bones about the head may be taken as examples.

Structure of Bones.—B. is composed of two structures—a hard, dense material like iron externally, and a reticulated, softer part internally, called the *spongy* or *cancellous* tissue. On examination with a microscope, the difference between these two kinds



Bone.

of tissue is found to be one of degree more than one of kind; for B. is everywhere porous, only in the hard external portion the meshes are much smaller and more filled with earthy materials. The one structure gradually passes into that of the other.

The relative proportions of these two kinds of tissue differ very much. In long bones the shaft is composed mostly of compact B., whereas the ends are composed to a great extent of spongy tissue. In flat bones this spongy tissue is scanty, and exists between the two layers of compact tissue. In the flat B. of the skull the spongy tissue is called *diploe*. The short bones are composed chiefly of spongy tissue. The spongy or cancellous texture of B. is composed of slender bars or spicula of B., forming a kind of network with spaces between them; and these spicula run in the line of greatest pressure, thus giving the greatest amount of strength with the least weight of B. These open spaces contain blood-vessels and marrow. The compact tissue also contains canals or tubes running in the long axis of the B., termed *Haversian canals*—so called in honour of the anatomist who first described them. Small blood-vessels run in these canals. The width of the Haversian canals varies from $\frac{1}{16}$ to $\frac{1}{8}$ of an inch. These are well seen on a transverse section of a long B. These canals are surrounded with concentric rings.

Chemical Composition of Bones.—B. consists of earthy and animal matter. The former renders the B. hard, the latter tenacious. The earthy matter consists chiefly of phosphate of lime, with some carbonate of lime. It also contains a small amount of other salts. The animal matter is chiefly Gelatine (q. v.). When bones are burned, the animal portion is consumed, and the earthy material remains behind. It constitutes about two-thirds of B. and is very brittle. By steeping B. in hydrochloric acid diluted with water, the earthy matter is dissolved out, and the animal portion remains behind, which is tough and quite flexible. It constitutes about one-third of B. When, from disease or other cause, one or other of these two portions is deficient, the B. becomes brittle or flexible, according as the earthy or animal matter is deficient. In the disease called *Rickets* (q. v.), there is a great deficiency in the earthy materials. Various chemists have analysed B. Their results are somewhat different, but the following may be regarded as the average.

Animal matter	·	·	·	·
Phosphate of lime	·	·	·	·
Carbonate of lime	·	·	·	·
Other salts	·	·	·	·

Growth of B. proceeds in two ways—either from cartilage becoming ossified, as in long bones, or by membranous tissue becoming ossified by the deposition of earthy matters, as in the flat bones of the skull.

The surfaces of B. have many marks upon them as eminences for the attachment of muscles, grooves for lodging vessels and nerves, holes or foramina for the transmission of vessels and nerves. Some have depressions forming the cavities of joints. In the centre of the shaft of most long bones may be seen a hole running obliquely into the centre of the B., for the entrance of the artery which supplies the marrow with blood.

Bones are richly supplied with blood-vessels and nerves. They are covered with a fibrous membrane termed *Periosteum* (q. v.).

Bone Ash, or Bone Earth, is the mineral matter that remains after bones are calcined, consisting of from 70 to 80 per cent. of calcium phosphate with other earthy salts. Large quantities of B. A. are imported from S. America; it is used in Assaying (q. v.) for making cupels, and though little employed as a manure by itself, it enters largely into the composition of Superphosphate of Lime (q. v.) and other artificial manures; it also forms a polishing powder for plate and other articles.

Bone Beds, the name applied in geology to deposits or formations of varying age, which contain organic remains of various kinds. Thus in the Upper Silurian rocks and in the Tilestones strata, one of the bands, containing the remains of fishes and Crustacea, have received the name of B. B.; whilst in the Triassic system, and beneath the White Lias strata, the Phœtic B. B. occur. These contain scales, teeth, and coprolites or excreta of fishes and reptilia. The name B. B. thus appears to be applied to formations more from the general appearance of their contained fossils, than from these consisting always of definite osseous structures.

Bone Black, or Animal Charcoal, the black product obtained by the destructive distillation of bones, consisting chiefly of phosphate of lime, intimately blended with the carbon of the organic matter of the bones. From 100 lbs. of large bones about 60 lbs. of commercial B. B. are obtained, of which only about seven lbs. are pure carbon or animal charcoal. The destructive dis-

tillation of the bones is conducted by placing them in iron pots, luting on the covers, and then exposing the pots to a red heat in a kiln for some hours. B. B. has the remarkable property of removing colouring matter from solutions of organic compounds, an action which is quickened by heat. It is on this account used on a large scale as a decolorising agent in the refining of sugar. B. B. also exerts its absorbent action on inorganic compounds, removing lime and other metallic oxides from their aqueous solutions. It is also valuable as a deodorising agent from its power of absorbing gases. After being used for a length of time as a decolorising or deodorising agent, B. B. becomes inactive, but its efficiency may be revived by treatment with acid or water, or by raising it to red heat; and when worthless in either respect, it is still useful as a fertilising agent from the phosphoric acid and nitrogen it contains. B. B. thoroughly ground, mixed into a paste with water and then dried, is also employed as a pigment called *Ivory Black*.

Bone Dust is the name given to the finest particles resulting from the disintegration of bones in a bone-mill, the other fragments being assorted according to size, as 'inch,' 'half-inch,' and 'quarter-inch' bones. It is usual to deprive the bones, by boiling, of a large part of their organic matter before breaking them. B. D. is valuable as a manure where rapid fertilising agency is necessary.

Bone Gelatine, or Osséin. See GELATINE.

Bone, Henry, a distinguished enamel-painter, born at Truro, Cornwall, in 1755, removed in 1790 to London, where he was engaged in painting brooches, lockets, &c., in enamel for jewellers. In 1780 he exhibited an enamel-portrait of his wife in the Royal Academy, and at once established a reputation in this department. He was appointed enamel-painter to the Prince of Wales in 1800, and was admitted a member of the Royal Academy in 1811. His pictures in enamel, from their beauty and size, form an era in this art. The chief of them are 'Bacchus and Ariadne' (sold for 2200 guineas), the 'Death of Dios,' 'Venus,' and 'Bathsheba,' besides numerous admirable portraits. B. died in London, 17th December 1834.

Böner, Ul'rich, one of the best of the early writers of fable in German, sprung from an old Bernese family, was a preaching friar, and flourished in the earlier half of the 14th c. He dedicated 100 fables, some in prose, others in rhyme, to his friend, the song-writer, Johann von Ringenberg, under the title *Der Edelstein* ('The Precious Stone'). They are full of keen observation of life, expressed with pungent wit and caustic humour. Lessing, who may be said to have disinterred this gem of middle age literature, devoted much of his time to the study of *Der Edelstein*, and wrote two papers about it. The first edition was printed at Bamberg, in 1461, and the copy in the Wolfenbüttel Library is the sole remnant of this edition that is known to exist. J. G. Scharf published, from the Strasburg MS., fifty-one of the fables, from 1704 to 1714. Bodmer and Breitinger, of Zurich, issued a fuller edition in 1757. The first complete edition, from the original text, was published at Berlin in 1816, with notes and a glossary; the latest is a critical edition, published at Leipzig in 1844.

Bones, Dissolved. The manure called *dissolved bones* is prepared by acting on Apatite (q. v.), Coprolites (q. v.), or on bones or bone ash with slightly diluted oil of vitriol. By this treatment the insoluble phosphate of lime, $\text{Ca}_3\text{P}_2\text{O}_7$, of which these substances are principally composed, is converted into soluble or *biacid* phosphate of lime, $\text{CaH}_2\text{P}_2\text{O}_7$, sulphate of lime or *gypsum* being formed at the same time. This manure is especially adapted for root crops, but is also of much value for cereals if mixed with guano previous to distribution.

Bonet, Juan Paulo, a Spanish philanthropist, born in the kingdom of Aragon, and lived in the first half of the 17th c. Out of friendship to the Constable of Castile, whose secretary he was, he undertook to instruct his brother, who had been a deaf mute from the age of two years. He afterwards applied himself with success to the instruction of others similarly affected, and in 1620 published at Madrid *Reduccion de las Letras y Arte para enseñar a hablar los Mudos*, in which he described the method adopted by him, and of which he claimed to be the inventor. The Benedictine Peter Ponce, also a Spaniard, had, however, succeeded in the previous century in instructing the deaf and dumb.

though B. does not appear to have known anything of the method of his predecessor. B. imparted information to his pupils principally by the eye, availing himself of the manual alphabet (essentially the same as that now in use), writing, and gesture. He also made use of artificial pronunciation. See Sir Kenelm Digby's treatise *Of Bodies*, ch. 28.

Bonfire, a large fire kindled on occasions of public rejoicing, on the top of a hill, or in some open space near a town or village. These fires are now lighted to celebrate great events, such as victories, royal marriages, &c.; but in the earliest times they were kindled to celebrate seasons—e.g., Beltein (q. v.) and Midsummer Eve. It was also a custom to light large fires as beacons. It seems to be admitted that *bon* is the same as the Dan. *baun*, beacon, and the Welsh *ban*, high: thus B. signifies a high or lofty fire, a fire on a high place, a beacon-fire.

Bongar (*Bungarus*), a genus of serpents belonging to the *Venosa* or poisonous section of the sub-order *Colubrina*. These forms are allied to the genera *Elaps* and *Naja*, to which latter the cobras belong. The bongars are distinguished by the back being keeled or ridged, owing to the development of a row of hexagonal scales. The head is broad and flat. These snakes occur in the E. Indies, and are popularly known as 'rock snakes.' *B. annularis*, a familiar species, attains a length of six feet.

Bongardia, a genus of plants of the natural order *Berberidaceæ* (q. v.), natives of the East (Greece, Syria, Persia, and on to Afghanistan and Scinde), the leaves of one of which (*B. chrysogonum*) are eaten as a salad, and the bulbs of another *B. Rakuolfi* in Persia. Some botanists consider both species identical.

Bongay, the name of an islet and group of islets in the E. Indian Archipelago, to the E. of Celebes.

Bongo, a people of Central Africa, inhabiting a country in the Upper Nile district, to the S.W. of the basin of the Bahr-el-Ghazal, between 6°–8° N. lat. and 27°–28° E. long. Estimated area, 9000 sq. miles; pop. 10,000. The country is flat and ferruginous, and is abundantly watered by five large tributaries of the Gazelle, and by many smaller streams. The chief natural products are sorghum, maize, beans, bamia, tobacco, and various tubers. *Parkia terminalia*, the butter-tree, and fungus abound, while there have been collected as many as 700 flowering plants. The rainy season extends from April to November. Formerly a great field for elephant-hunting, Bongoland has now only antelopes, ichneumons, civets, genets, wild-cats, and caracals. Its domestic animals are poultry, goats, and dogs. The B., who believe in witchcraft, and speak a harmonious language of simple structure (Dr Schweinfurth, *Linguistische Ergebnisse einer Reise nach Central Afrika*, Berl. 1873), live by agriculture, and occasional hunting and fishing. They have a red-brown complexion, not unlike the colour of the soil, and are muscular and compact in limb, with an average height of 5 feet 7 inches. Almost without tools, they produce beautiful ironwork, besides rude musical instruments, and a variety of wooden articles. About the year 1855 the Nulian slave-dealers began their raids upon the B., whom they found living in petty communities, and therefore incapable of combined defence. The B. soon became much prized as slaves, being docile and industrious, and within ten years there were eighty slave seribas or forts scattered over the country, while half the natives had been kidnapped, and great numbers had taken to flight. The country is still under vassalage to the Khartoom slave-dealers, and forms a convenient base for further slave operations in the lands of the Niam-Niam, Mittoo, &c. See Dr Schweinfurth's *Heart of Africa* (2 vols. Lond. 1873).

Bonheur, Mdle. Rosalie, an animal painter of remarkable genius, born at Bordeaux, 22d March 1822, received instruction in art from her father. She exhibited 'Two Rabbits' and 'Goats and Sheep' in the French Exhibition of 1841, and from that year to the present she has continued to enrich and distinguish the exhibitions of Europe with works, the number of which manifests her entire devotion to her art. She is best known in this country by her 'Horse Fair,' in which the action of the animals in motion seems to be nature itself. This famous work, which was the chief attraction of the French Exhibition of 1853, and of the French collection exhibited in London in

1855, has been admirably engraved. In the opinion of some, however, her chief work is 'Le Labourage Nivernais' (1849), which has won the highest honour conferred in France, a place in the Gallery of the Luxembourg. In the B. family there are as many painters and sculptors as there are members. Besides the father, Raymond B. (died 1853), there are her brothers, Auguste B., landscape and genre painter, Jules-Isidore B., sculptor, and Juliette B. (Madame Peyrol), her sister. The studio and residence of Rosa B. at Fontainebleau were spared and respected by special order of the Crown Prince of Prussia during the siege of Paris in 1870–71.

Bo'ni, or **Bony**, a considerable native state, forming the S.W. peninsula of the island of Celebes, E. Indian Archipelago, and tributary to the Dutch. Pop. about 200,000, engaged in the manufacture of cotton, articles of gold and iron, and, especially in the N., where the soil is very fertile, in agricultural pursuits. The Bonese have been twice attacked by the British for injury done to their commerce, and for selling the crews of British ships as slaves. B., Gulf of, separates the S.E. and S.W. peninsulas of Celebes. It is 200 miles long, and has a breadth varying from 40 to 80 miles.

Boniface, a Roman general of the 5th c. A.D., was a native of Thrace. His career is divisible into two periods, the first marked by the greatest loyalty to the empire, the second memorable for a great political crime which has covered him with disgrace. In 413 he defended Marseille against Ataulf, the Visigothic king; in 422 distinguished himself in Spain against the Vandals; and after being raised to the rank of tribune and comes, was charged by Honorius with the command of the Roman forces in Africa. He enjoyed for a time the confidence of Placidia (sister of Honorius) when she undertook the government of the empire during the minority of her son, Valentinian III., but the rivalry between him and Ætius (q. v.) is said to have prompted the latter to subtly undermine his influence at court during his absence abroad. The story of the fraud perpetrated by Ætius is recorded by Procopius, and accepted by Gibbon (*Decl. and Fall*, ch. 33), but it is probably exaggerated. Falsely induced, it is said, to believe that the empress meditated his death, in a moment of rash ire he traitorously allied himself with the Vandals, invited them over to Africa, and offered to give them a perpetual settlement. In 429 Genseric appeared at the head of 50,000 warriors, and B. discovered when too late that he had been basely deceived, and had fatally injured the empire. Returning to his allegiance, he twice sustained a defeat from the Vandals, and in 431 embarked for Italy, but in the following year died of a wound received in a battle fought against Ætius.

Boniface, St. 'the apostle of Germany,' whose original name was Winfrith, was born at Kirton (Crediton), Devonshire, about 680. Ordained a priest at the age of thirty, he set out in 715 to preach the gospel in Friesland; but being discouraged by the king, and hindered by a war then being carried on, he gave up the idea for a time, and returned to England. In 718 he went to Rome, and got the sanction of the pope to preach to the tribes of Germany. He at once commenced his labours, and converted many in Thuringia, Bavaria, Friesland, and Hesse, turning heathen temples everywhere into Christian churches. On a second visit to Rome, he was made a bishop, and his name changed from Winfrith to B. Returning to Germany through France, with letters of recommendation to Charles Martel and the German princes, he set about destroying all relics of heathenism. On the accession of Pope Gregory III. (731), B. was made an archbishop. In 738 he again visited Rome, attended by a great train of priests and monks, and was made papal legate. On his return he appointed four bishops over Bavaria, and four more in Germany in 741. In 745 he was made Archbishop of Mainz. In 754 he returned to Friesland, to complete the evangelisation of that country, where, however, he and fifty-two companions were massacred by the pagans (755). B. left *Sermons* and *Letters* (Serrarius, Par. 1605; best ed. Würdtwein, Mainz, 1789), which are valuable for biographical purposes, and a very curious historical commentary on his own times. Dr Giles has published his entire remains (*Opera Omnia*, 2 vols. Lond. 1845). See Eudeniis, *Diss. de S. Bonifacio, Germ. Apost.* (1722); the *Acta Sanctorum*, and the Church Histories of Neander, Mosheim, &c.

Boniface. Nine popes have been so named, of whom only three are conspicuous in history.—**B. I.** (418–422), memorable as the earliest Bishop of Rome who assumed the title of the First Bishop of Christendom, a title not recognised by the Greek emperors till 606, when Phocas conceded it to **B. III.**—**B. VIII.**, whose family name was Gaetano (Lat. *Cajetanus*), one of the important pontiffs and juriconsults of the middle ages, born at Anagni about 1228. He studied at Paris and Bologna, and, in the capacity of secretary to various papal legates, visited France, England, and Germany, thoroughly mastering the condition of ecclesiastical politics. In 1281 he was raised to the cardinalate, and was elected pope December 24, 1294, when the kings of Hungary and Sicily held his bridle-reins as he rode to the Lateran, and waited on him at table, wearing their crowns. The great principle of **B.**'s policy was to assert papal supremacy over states as well as over the Church. In 1296 began his grave quarrel with Philippe le Bel, by the publication of his bull *Clericus laicos*, and ere long he rashly excommunicated the French monarch; but his language and his pretensions were so insolent that the nation supported Philippe in his defiance of the papal curse. There was hardly a question in which **B.** did not interfere. In the Sco-to-English wars, in the affairs of Sicily, Denmark, Germany, Bohemia, &c., we see him meddling and muddling. Finally Philippe roughly ended the conflict by seizing and imprisoning **B.** in his native town. Dreading poison, the pope abstained from food for two days, in consequence of which he died a few weeks after (October 11, 1303). His enemies accused him of licentiousness and infidelity. His simony was well known, and he has found an unenviable immortality in Dante's *Inferno*. See *M. Isambert's* elaborate paper in the *Nouvelle Biographie Générale*, and *Drumann's Geschichte B.'s VIII.* (Königsb. 1852).—**B. IX.**, originally Pietro Tomacelli, a Neapolitan, was elected pope in 1389, and had for rivals at Avignon Clement VII. and Benedict XIII. He practised simony without concealment or restriction; trafficked in indulgences and dispensations; over-awed Rome by fortresses; and to protect himself against the enemies whom his imperious spirit had raised against him, he had to purchase the services of powerful allies by granting them as fiefs portions of the patrimony of the Church. **B.** died 1st October 1404.

Bonifacio, Strait of (Lat. *Fretum Gallicum*), the channel which separates Corsica from Sardinia, named after the fortified Sardinian town of **B.**, which has large coral and tunny fisheries, and a pop. of 3453. The strait narrows at one point to about seven miles, and is difficult of navigation. To the E. lie the Bucinaric or Magdalen Islands (anc. *Insula Canicularia*), belonging chiefly to Sardinia, but mostly inhabited by Corsicans.

Bonill'o, a town in the province of Albacete, Spain, 38 miles S.W. of the city of the same name. Pop. 5980.

Bo'nin, or **Archbishop Islands**, a group of some ninety small islands situated in the Pacific Ocean, near long. 142° E. and lat. 27° N. The larger islands (Peel Island, Stapleton, Buckland, Hillsborough, &c.) are fruitful, producing, among other things, maize, yams, tobacco, sugar-cane, melons, and lemons. Of domesticated animals, pigs, goats, and fowls abound. This group was discovered in 1827 by Captain Beechey; was at one time a Japanese colony, and though claimed by England and Russia, was again taken possession of by the Japanese in 1877.

Boni'to, a term applied to various Teleostean fishes, but more particularly to a species of tunny (*Thynnus pelamys*), included in the *Scomberidae* or Mackerel family. This fish chiefly inhabits the warmer seas, and relentlessly pursues the flying-fishes. This species, often named the 'stripe-bellied tunny,' averages about 24 inches in length, and is coloured bluish, being darkest on its upper parts. Four lines of dark hue mark the sides of the belly. The flesh is of a dry, unpalatable nature. The lower jaw protrudes and is slightly deflected, and large scales exist on the throat. The *Pelamys sarda*, belonging to an allied genus, inhabits the Black Sea and Mediterranean, and is also known as the *B.*; and the *Auxis vulgaris* (Cuvier), also found in the Mediterranean, is locally named the Plain *B.* This latter species is coloured blue, and has no stripes or bands. The flesh is preserved for use. The dorsal fins are placed far apart in the *Auxis*.

Bonn, a town of Rhenish Prussia, on the left bank of the Rhine, 15 miles above Cologne (with which it is connected by

rail), formerly the residence of the Electors of Cologne. Pop. (1871) 26,244. Though an ancient town, it has a modern appearance, and the environs are pleasant and cheerful. The finest building is the cathedral, probably of the 12th or 13th c. The university, re-established in 1818, has five faculties, two of these in theology, for Protestants and Roman Catholics respectively. It has a high reputation, and reckons in its roll of professors the names of Niebühr, Schlegel, Dörner, Rotto, Ritschl, Brandis, Jahn, Lassen, Simrock, Diez, Dahmann, Von Sybel, &c. The library has upwards of 200,000 volumes. In the same year the Leopoldine Academy of Physical Science was transferred to **B.** from Vienna. These educational facilities attract a large body of students, and the late Prince Consort studied here for some time. The manufactures are cottons, sulphuric acid, soap, and earthenware. The fortifications of the town, which suffered several bombardments, were razed in 1717. See Ritter's *Entstehung der Allensteinstädte am Rhein, Köln, Bonn, und Mainz* (Bonn, 1851).

Bonn'er, Edmund, better known as the 'bloody Bishop **B.**,' was born about the end of the 15th c. The son of a peasant in Hanley, Worcestershire, he was educated at Pembroke College, Oxford, where in 1525 he was made a Doctor of Canon and Civil Law. Being fortunate enough to secure the favour of Wolsey, he also gained that of Henry VIII., whose chaplain he became, took an active part in the Reformation, was employed on embassies to France, Germany, and the Pope, and was raised to the see, first of Hereford (1538), and then of London (1540). He lapsed, however, into Popery, and in the reign of Edward VI. was deprived of his bishopric and put in prison. Mary restored him; and he earned the name by which he is still known by his official prominence in connection with the persecutions of Protestants in the reign of this queen, although there is some reason to believe, with Mr Green and other of the later historians, that he was at heart a good-natured, and even merciful man. Refusing to take the oath of supremacy after the ascension of Queen Elizabeth, he was deposed once more, and thrown into the Marshalsea prison, where he died 5th September 1569. **B.** was a man of considerable learning, and believed to have a thorough knowledge of canon law.

Bo-net, a kind of cap or head-dress, generally of a flat shape, and fitting closely to the head. At the present day the name is chiefly restricted to the principal head-gear of women, which alters so frequently in shape, material, and decoration that it defies all definition or description. Bonnets, as an article of male attire, consist of the indigo-blue knitted and felted caps which are regarded as a peculiarly Scotch production, and chiefly manufactured at Kilmarnock and the surrounding Ayrshire villages. In the 18th c. a broad flat *B.* with a large red tassel, known as the 'braid bannet,' was the distinguishing head-dress of the Scottish peasantry. This form of *B.* has now entirely disappeared, but the 'Glengarry' and other fancy shapes have still a wide popularity, and are sent in great numbers to all parts of the world in which a Saxon population is found, and it forms the regulation-cap of British foot-regiments. The name *B.* is not found commonly applied to caps till the time of Henry VIII., of whom we read that at a banquet at Westminster he wore a *B.* of damask silver, flat woven in the stole, and thereupon wrought with gold, with rich feathers on it. At that period Milan bonnets, or Mellayne bonnets, came much in vogue, and were worn by both sexes, whence to this day the makers of female head-dresses are known as 'milliners.' Milan bonnets of the 16th c. were generally made of costly materials, and richly decorated with gems, precious stones, and metals.

Bonnet, in permanent fortification, is a small defence-work, consisting of two faces only, with a parapet three feet high by ten or twelve feet broad. It is constructed at the salient angles of the glacis of larger works. *B. de prêtre* is a term in field fortification applied to an indented line of parapet having three salient angles.

Bonnet, Charles, a distinguished naturalist and philosopher, was born at Geneva, March 13, 1720, and at the age of twenty was elected a corresponding member of the Paris Academy of Sciences for a dissertation on aphides. He now devoted himself wholly to scientific investigations. After publishing his *Traité d'Insectologie* (Paris, 1745), and his *Recherches sur l'Usage des Feuilles des Plantes* (1754), he was forced to discontinue his

researches for a time, owing to inflammation in the eyes; whereupon he turned his attention to psychology, and published several works distinctly materialistic in their teaching, though he always remained a sincere Christian, and in defence of Christianity. We may mention in particular his *Essai de Psychologie* (1754), *Essai Analytique des Facultés de l'Âme* (1760), *Contemplation de la Nature* (1764-65), *Recherches Philosophiques sur les Preuves du Christianisme* (1773). B. died at Geneva, May 20, 1793. His *Œuvres Complètes* were published at Neuchâtel (8 vols. 1779-83), and most of them have been translated into nearly all the languages of Europe. See Trembicy's *Mémoire pour servir à l'Histoire de la Vie et des Ouvrages de Ch. B.* (Berne, 1794).

Bonn'et-Pepp'er, derived from the ground capsules of *Capsicum tetragonum*, a native of India.

Bonn'et-Piece, a Scottish gold coin of the reign of James V., struck in 1539 from native gold, and exquisitely beautiful in design and workmanship. It derives its name from the royal head, on the obverse side, being covered with a bonnet instead of with a crown. The weight is 72 grains.

Bonne'val, Claude Alexandre, Comte de, latterly known as Achmed Pasha, was born of a noble French family at Coussac, in Limousin, July 14, 1675. He served in the Guards with great distinction in Italy (1701) and the Netherlands; but being condemned to death by a court-martial for his insolent behaviour to the Minister of War (1702), he fled to Germany, entered the Austrian service (1706), distinguished himself against his native country, and also against the Turks under Prince Eugene, and was raised to the rank of lieutenant-field-marshal (1719). In 1723 he was sent to the Netherlands as master-general of ordnance; but here again a court-martial condemned him to death for his insolence. The Emperor changed the sentence to one year's imprisonment, and he was banished from Germany. He found a welcome asylum in Constantinople, became a Mohammedan (1730), was made a pasha of three tails, and did good service for Turkey against Russia and Persia. After defeating a large Austrian army on the Danube, he fell into disgrace, and was banished to Asia Minor (1738-39), but was afterwards recalled. B. died at Constantinople, March 27, 1747. The only book which can be safely used for a knowledge of B. is *Mémoires du Comte de B.* by the Prince de Ligne (Par. 1817). Other professed memoirs are mere romances.

Bonnycastle, John, a self-taught mathematician, born at Whitchurch, Buckinghamshire. After acting for some time as tutor to the two sons of Lord Pomfret, he became Professor of Mathematics at the Royal Military Academy, Woolwich, a position retained by him for more than forty years. Of his numerous treatises, elementary and more advanced, on the several branches of mathematical science, the best known is his once popular *Elements of Algebra* (2 vols. 8vo, 1813), which has been superseded by the more modern works of Todhunter, Colenso, and Hamblin Smith.

Bonn'y River, the largest and most easterly mouth of the Niger, Upper Guinea, West Africa, falling into the Bight of Biafra. Its bar forms a safe anchorage, convenient at all seasons and tides. On its east bank, near the mouth, is the town of B., formerly infamous for its slave traffic, but now more creditably occupied in the export of palm oil.

Bono'rum, Cess'io. See CESSIO BONORUM.

Bon'pland, Aimé, a celebrated traveller and botanist, born at La Rochelle, August 22, 1773. After studying medicine and serving as a ship's surgeon, he accompanied Humboldt during five years of travel in America. On returning to France, B. was made superintendent of the gardens at Malmaison. In 1816 he went to Buenos Ayres to introduce European trees and plants. Five years afterwards, when journeying to Bolivia, he was seized and kept prisoner by Dr Francis, then Dictator of Paraguay. Freed in 1831, he fixed his abode at San Borja, in the S. of Brazil. In 1853 he removed to Santa Anna, in the Argentine province of Corrientes, where he devoted himself to science until his death, 4th May 1858. His chief works are *Plantes Équinoxiales Recueillies au Mexique*, &c. (2 vols. Par. 1805, et seq.), *Mono-graphie des Miliastomées*, &c. (2 vols. Par. 1806, et seq.). His

exceedingly rich collections, part of which he intended to present to the Paris museums, still remain in Corrientes.

Bon'us. The dividend to the shareholders of a company is called a B. in so far as the directors do not wish to lead the shareholders to expect its repetition. Thus the declaration of a dividend of 5 per cent. with a B. of 2, would mean that at next period the directors fully expected to repeat the 5 per cent., but that repetition of the 2 per cent. is not to be expected.

Bon'yhád, or Bonhard, an antique town in the county of Solna, Hungary, 23 miles N.E. of Fünfkirchen, and 98 miles S.S.W. of Buda, Pesth. It is about a mile distant from a branch line of railway by which it has now (1875) communication with Vienna, Italy, the S. of Hungary, and N. of Bosnia. It has an increasing trade in corn, wine, and tobacco. Pop. (1869) 5340.

Bony Pike (*Lepidosteus osseus*), a genus of *Ganoid* (q. v.) fishes, not at all allied to the common or *Teleostean* pikes, and found in the lakes and rivers of N. America. This fish possesses a complete armour of *ganoid* scales, which are arranged obliquely in transverse rows. This is the only fish in which the bodies of the vertebrae are *opisthocelous*—that is, hollow behind and convex in front—all other fishes possessing *amphicelous* vertebrae, or those hollow at both ends. The spine is well ossified. The jaws are prolonged to form a snout, and are provided with double rows of teeth. The tail is *heterocercal*, or unequally lobed. Both edges of the tail-fin, and the front edges of the other fins, are furnished with small bony pieces termed *fulcræ*. These fishes possess opercular gills and *pseudo-branchiæ* as well. The air-bladder is large and cellular. These fishes attain a length varying from two to four feet, and their flesh is esteemed for table.

Bonz'es, from Japanese *Busso*, a pious man, a name applied originally to the priests of Japan, but now extended by the Portuguese to other priests in China, Cochin China, &c., especially those of Buddha. There are both male and female B., and they have their respective convents.

Boo'by (*Sula fusca*), a genus of *Natatorial* birds belonging to the Gannet (q. v.) genus, and included in the family *Felcanidae*.

This name is applied to these birds from the inactivity they display, and from the ease with which they may be caught; the boobies allowing their captors actually to seize them as they sit. The B. inhabits the warmer latitudes of the world, and is chiefly found in the neighbourhood of rocky coasts. It frequently flies far out to sea, and is an expert fisher; although the Man-of-war Bird (q. v.) and Frigate Bird (q. v.) persecute the B., and force it to disgorge the finny prey it has just captured. The colour of this bird is a dark brown on the upper, and white on the under parts; the young birds being of a more uniform brown. The bill is longer than the head, and is of straight, conical form and shape. The nest is placed on the ground, and but one egg is produced and hatched at a time. The flesh is dark coloured and not esteemed. The northernmost American limit (on the east coast) of these birds appears to be at Cape Hatteras. Audubon says these birds are not invariably listless, but become wary and active enough in certain cases.

Boo'y Island, a flat, dangerous, and barren rock in Torres Strait, off the N. of Australia, about 3 feet in height and $\frac{1}{4}$ mile in diameter.

Boodroom', or Bodrun', a dirty seaport town of Asia Minor, in the vilayet of Aidin, built on the site of the ancient *Halicanassus*, the birthplace of Herodotus and Dionysius, about 96 miles S. of Smyrna. It is finely situated on the N. shore of the Gulf of Kos, and its harbour, where some shipbuilding is carried on, is defended on the east by a fortress built by the Knights of Rhodes. Pop. about 11,000.



Booby.

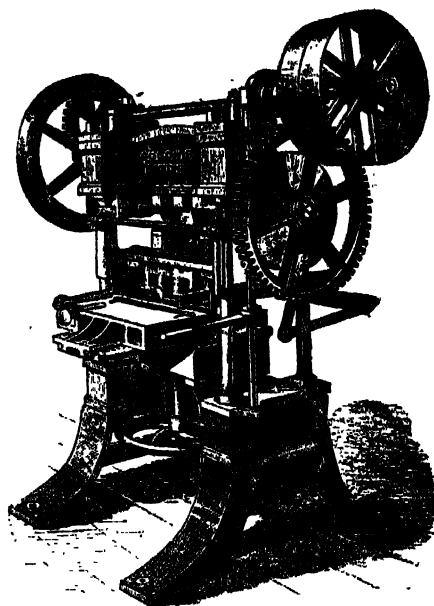
Book. This Teutonic word, as well as the Greek *biblos* and the Latin *liber*, is connected with the name of the rude material originally employed for the purpose of recording events. Inscriptions on tree-bark or leaves, on brass or stone, or on the tiles and bricks used at Nineveh, are not books. The idea of a B. is that of a record rolled up, as was done with the *scapi* or rolls of papyrus which for many centuries were exclusively used at both Rome and Alexandria. Parchment, consisting of the skins of lambs, sheep, and calves, was also rolled in the same way. In the 7th c. mixed rolls of parchment and papyrus were not uncommon. Another type of B., in which not only paper and parchment, but also the waxen tablets of the Romans, were used, is seen in the *Codex*, which, differing from the continuous *volumen*, consisted of separate leaves or pages fastened together at one corner. Official documents, named *libelli*, were also constructed in this way. When the multiplication of copies was carried on systematically in the Benedictine and other monasteries, this form was preserved, and binding in wood, metal, or leather was added. The rolls had previously been preserved in boxes. Till after the introduction of printing, the monks and scribes at the great universities chiefly exercised themselves in producing copies of the Bible, the classics, and certain theological works. In the 16th c., however, an enormous impetus was given to production, 326 editions of the Bible being printed in English between 1526 and 1600. As the modern manufacture of paper was established, and the writings of the essayists excited a taste for popular literature, books increased rapidly in number, 5280 appearing between 1700 and 1756, a very large proportion of which, however, belong to divinity and law. It would be tedious to enumerate the varieties of B. which have succeeded to the folios and quartos of the 17th c. The circle of readers and of subjects has been constantly extending. Formerly respectable authors, like Rushworth and Ockley, were ruined by a single B., but now literature is a secure profession, and there is active competition among publishers. Apart from its importance as the vehicle of literature, the B., viewed as a mere permanent record, has had important social effects. Thus *Bocland*, or land of which the title is in a definite B. or record, is really equivalent to full private property in land, as distinguished from *Folcland*, in which public interests were preserved. In Scotland, a statute was thought necessary in 1696 to authorise the writing of deeds 'bookwise,' i.e., in leaves, instead of in a continuous roll as formerly.

Book-binding. When the printed sheets of a volume leave the hands of the printer, they are delivered to the bookbinder to be made up into proper book form. This work is done partly by men and partly by women. The sheets pass first into the hands of the women, who fold them into their proper size, 4to, 8vo, 12mo, 18mo, 24mo, 32mo, the sizes being so named from the number of pages on each side of the sheet. They are then gathered in the order of the book, and plates inserted, if any; and generally at this stage the sheets are pressed closely together, either in a rolling machine, a hydraulic press, or a new machine called a 'smasher,' to exclude the air and give solidity to the book. Afterwards they are sewed sheet by sheet on tape, if for cloth binding, and on cord, if for stronger binding.

In cloth binding, the sewed books are next rounded in the back by a hammer, and jointed by a 'backing machine.' The cases or boards are made separately, of cloth and mill-board, and the gold and other ornaments stamped on their backs and sides by means of stamps fixed and heated in a blocking or arming press, and pressed with a heavy pressure on the boards. The accompanying fig. represents Gough's patent printing and arming press, the most useful recent invention in this department. By means of it 600 cases can be finished in black printing and gold per hour. If the books are to have gilt edges, they are first cut smooth all round by the guillotine or cutting machine, and then fixed into gilding presses, where the gilder washes the edges with an adhesive glaire, consisting of the whites of eggs. While the glaire is still moist the gold-leaf is laid on, and when dry the gilder burnishes the edges with an agate burnisher. The two parts being now finished, the book is fixed into the case by merely pasting the coloured papers at the ends, the small projecting tapes, and a small piece of thin cloth over the back of the sheets to each board. The books then get a nip in a hydraulic press to make them solid and firm. Great taste is now displayed in the outward appearance of cloth books, in many

cases helping the sale of an intrinsically worthless volume. But cloth bindings, however good and elegant they may be, have certainly not the property of durability to recommend them.

It is otherwise with books bound in leather. Indeed this only can be called 'binding.' The process differs considerably from that already described, so much so, that few cloth-binders can



Gough's Arming Press

do leather-work, and *vice versa*. For leather binding the sheets are folded and arranged as for cloth binding; they are sewed together, however, more firmly, and on three or more pieces of cord passing through the back, the ends of which are left an inch or so longer than the thickness of the book. In cloth binding the boards are made separately, and fastened loosely to the book; while in leather binding the ends of the cords above mentioned are securely fixed into the boards. The edges are then cut round, and gilt or marbled,—the latter effect being produced by colouring matter being sprinkled on the surface of water, and mixed by means of combs for producing the various patterns, and the book being lightly dipped in the colours, enough adheres to give the marbled edge. The *forwarder* next lays on the silk headbands at the top and bottom, and then prepares and draws on the cover, whether of calf, morocco, or russet leather. The books are then placed under a moderate pressure and allowed to dry. When this is done, the *finisher* takes them in hand, and by the skilful use of a variety of brass tools for the purpose, and of gold-leaf, he stamps on the letterings and the patterns which give to a well-bound book such an air of luxury. If books are *half-bound* in the same way, they should be as durable as full-bound ones; but the only saving effected can be in the smaller quantity of leather used.

In stationery B., such as ledgers, day-books, cash-books, &c., the process is much the same as above, the chief difference being in the materials used requiring to be stronger and heavier.

The B. trade is very extensive, and employs a large number of men and women in all large cities; and in the higher branches of it, such as finishing, there are men who may well rank as artists, whose productions are essential to the adornment of the noblest mansions.

Book-Club, a society for the purchase of books, to be used by the members, and then sold or distributed among them. The Bachelors' Club at Mauchline, to which Burns belonged, spent only its fines on books, but may be taken as a specimen of the reading-society not uncommon in Scotland at the end of the 18th c. Lord Brougham, in *Practical Observations on the Education of the People* (1825), warmly urged the establishment of such societies on the basis of weekly or monthly

contributions. They were chiefly useful in localities where a circulation could be conveniently carried on among a sufficient number, but where the ancient bookstall or the intermediate itinerant library did not come, and where the prospect of profit did not tempt the more recent lending-library. The feeling of corporate responsibility in these matters is rapidly growing, but voluntary agency is still active—(1) in connection with special subjects—e.g., a medical or legal reading-club; (2) in connection with a special propaganda—e.g., that of a congregation or Sunday-school—the selection of books being often very narrow.

Book-keeping is believed to have originated with the Venetians, who were the great traders of the 15th century, and the first treatise on the subject was written by Lucas Pacioli, usually called Lucas de Burgo, a learned monk of the Minorite order, and was published at Venice in 1494. The system expounded by De Burgo was universally practised by the merchants of Venice, and is still that generally used. It is known as the 'Italian method;' and was so perfect and complete at first, that but little improvement has been made upon it up till the present time.

The leading purposes of B. are—(1) to secure a correct record of all transactions between traders and those with whom they deal; and (2) to enable them at a given time to ascertain and exhibit the exact position of their affairs. The importance of these objects, it must be apparent, cannot be over-estimated; yet the reports of the Bankruptcy Courts show conclusively how many conduct their business either without books at all, or with these kept in a most unsatisfactory manner.

The principles of the Italian method are exceedingly simple, and may be apprehended and applied by any person with an ordinary amount of intelligence. Every trader will be the best judge what subsidiary books are necessary for fully and correctly recording all the transactions in his business, but there are several books which are quite indispensable. These are *day-book*, *invoice-book*, *cash-book*, and *ledger*. The *day-book* gives a record of all goods sold on credit, the buyer being debited for the amount. An entry should be made periodically for goods sold for cash, 'cash sales' being made *Dr*. In B. by double entry, either each individual entry may be credited to another account, or the summation of the whole month's entries may be credited to 'goods' account. In the *invoice-book* are entered all goods purchased, the amount or details of each invoice or account of purchases being specified. An entry should also be made periodically of goods purchased for cash, 'cash purchases' being *Cr*. The *cash-book* contains a record of all cash received and cash paid, the former being entered on the debit side, or left-hand page, the latter on the credit, or right-hand page. The difference of the summation of the columns, when a balance is made, is the cash on hand, which is carried forward to the next period. In some kinds of business a *journal* is kept, in which the entries of the other books are classed under general heads. All the entries during the month in which the same person or thing is *Dr* or *Cr* are collected under the title 'Sundries,' with the amounts. Thus the debit side of the cash-book is transferred under the title, 'Cash *Dr* to sundries,' and the credit side under that of 'Sundries *Dr* to cash.' All the entries in the day-book, invoice-book, and cash-book are posted direct, if a journal is not used, to their several accounts in the *ledger*, it being thus the summary of every transaction that has taken place. Every debtor and creditor named in these books must have a folio, or part of one, set apart for the transactions in his or its name. The goods sold, as in *day-book*, are posted to the debtor side of each customer's account; the goods bought, as in *invoice-book*, are posted to the credit side of each creditor's account; while the cash received is posted to the credit, and the cash paid to the debit, of the party in whose name the cash is entered. When every entry in these three books is correctly posted into the ledger, the position of every debtor's and creditor's account is seen at a glance. But besides ordinary debtors' and creditors' accounts—that is, personal accounts—there arise a number of other accounts which must be kept and balanced in order to complete the system. Among these miscellaneous accounts may be classed—(1) 'Goods,' the total of goods sold being posted to the credit side, and of goods purchased to the debit side—the difference being *gross profit*; (2) 'Profit and Loss,' to which the difference under (1) is carried, also the bad debts, expenses, &c.—the difference being

net profit or loss; (3) 'Charges,' which will embrace rents, taxes, postages, salaries, and wages, if these latter are not kept in a separate account, and which must be posted to the debit of profit and loss. In personal accounts, the balance shows the merchant's indebtedness to others, or theirs to him. When the books are balanced, the balance of the profit and loss is posted—if profit, to the credit, or if loss, to the debit of the stock account, representing the proprietor; or when there is a partnership, this same balance is divided according to the terms of co-partnership, and posted to each partner's account accordingly.

Business books, kept as above described, form a double-entry set, as it is termed, every debtor having a corresponding creditor, and *vice versa*.

There can be little doubt that commercial misfortune often comes of badly-kept books; yet the first formation of such a set of books, and their constant maintenance in a perfectly satisfactory state, requires only ordinary intelligence to express correctly and clearly the first record; promptitude in doing it while the transaction is fresh in the memory; punctuality, watchfulness, and clerical accuracy in advancing the record through the books. If this is conscientiously done, the scientific principles of the method will keep everything right. The state of the merchant's affairs can then be easily and readily ascertained; and in case of misfortune, his character will be vindicated from at least one reproach.

B. by single entry is devoid of any scientific method, is unsatisfactory in its working, and wholly inadequate for the proper exhibition of mercantile accounts, or the right conduct of a complex business. It answers, however, sufficiently well for the operations of a small retail trader. By this method the principle is kept out of view that every *Dr* must have a *Cr*, and every *Cr* a *Dr*; and the first record of a transaction is made with a *Dr* only or a *Cr* only, by the principles already explained; so that the ledger will contain an account for a *Dr* only or a *Cr* only, each entry being made but once in the ledger, either on a debit or a credit side. In a set kept on this principle, a *day-book*, *cash-book*, and *ledger* are deemed sufficient. The balancing is simply effected. The ledger accounts are closed with *To*. By balance as the case may be; and a *Dr* and *Cr* balance account being then formed, and the cash balance entered in it, the account is closed with the entry, 'By present nett capital.' It will be easy for a trader using such a set to have a few accounts made up by double entry at monthly or quarterly periods, in order to exhibit a clear summary of his transactions. For all the purposes required by a professional man, a simple ledger of this kind, combined with a cash-book or cash-ledger account, ought to be sufficient. See treatises on *Bookkeeping* by Theo. Jones (Lond. 1846), Dr J. Bryce (Glasg. 1873), and F. H. Carter, C.A. (Edinb. 1875).

Books of Adjournal are the records of the Court of Justiciary in Scotland.

Books of Sederunt are the books in which the Acts of Sederunt (see under ACT, *Act of Sederunt*) of the Court of Session in Scotland are recorded. They contain the names of the judges present at each meeting. Formerly most public papers of importance were recorded in these books, and even matters totally unconnected with the business of the Court were recorded, such as eclipses and other remarkable events.

Book Scorpion (*Chelifer*), the name applied to certain small Arachnidans (q. v.) belonging to the lower division (*Trachearia*) of that class. They are included in the order *Adelarthrosomata*, and derive their name from the fact of their being commonly found amongst old books, whilst their general appearance resembles that of miniature scorpions. The abdomen is more or less distinctly segmented, and the maxillary *palsi* or appendages of the jaws are very long, and are terminated by *chela* or nipping-claws, so as to give the creature the appearance of possessing five pairs of limbs. They appear to subsist on small insects, and may occasionally be seen attacking the common fly.

Bookstalls. The practice prevailed in early times of exposing goods for sale on temporary structures, erected either in fairs or markets, or under the shadow of public buildings in towns, and, in connection with the sale of books, has lingered on, though in a very modified form, to our own time. B. are

very numerous in Paris, and are still to be found in London and Edinburgh. In many of them, however, cheap reprints in gay bindings have in a great degree ousted the old grey volumes in which the former salesmen exclusively dealt. Keepers of B. have occasionally risen to eminence in the trade. Of this we have an example in the case of Lackington, an extensive London bookseller in the last c.; and in the present, in the great house of the Messrs Chambers in Edinburgh.

Book Trade. The important and interesting commerce in books as commodities comprises the two departments of publishing and bookselling. The latter of these sections of the trade was represented by the sellers of MSS. as far back as ancient Greek and Roman times; while publishing, as a distinct form of business, only came into existence with the invention of Printing (q. v.). Fust, Schœffer, Gutenberg, and Caxton—men occasionally combining in themselves the functions of printer, bookseller, and author—must be regarded as the founders of the modern trade. This article has for its subject the gradual growth and the development of the resources of that trade in the various countries where it has risen to importance.

England.—The B. T. of this country was beset in its infancy by proclamations and patents-royal, Star Chamber decrees, university licences, and charters of monopoly. In contradistinction to the early printers of the Continent, who mainly produced classics in the original, those of England supplied the aristocracy with classical translations and abridgements, French and Italian romances, old chronicles, devotional works, &c. Caxton (q. v.) issued 64 books, Pynson 212, while Wynkyn de Worde (1493-1535) actually published 408. There are on record the names of 350 English printers between 1474 and 1600; and, according to Evelyn, the loss of booksellers' stock at the Fire of London (1666) amounted to £200,000. (See STATIONERS' COMPANY.) In the fourteen years following 1666 there appeared 3550 books, of which a large proportion were theological. The beginning of a periodical literature consequent upon the Revolution of 1688 is a noteworthy event in the history of the trade. In 1738 the Copyright Act, 8 Anne, c. 19, the last of a long series of restrictive measures, expired, and the trade has ever since been free. It has extended marvelously, and has within late years developed quite a new phase in the issue of cheap literature, inaugurated by the appearance of Constable's *Miscellany* (1827), and the *Library* (1827) of the Society for the Diffusion of Useful Knowledge. Charles Knight, Archibald Constable, and W. & R. Chambers of Edinburgh, and H. G. Bohn, were the publishers who subsequently, perhaps, did most to foster the popular taste for literature.

A determined effort was made some years ago by the leading publishers and booksellers in Great Britain to regulate the prices at which books should be sold to the public, and the whole case was submitted for the decision of Lord Campbell. He decided against the movement, and the result has been that free trade has since been carried to such an extent in the operations of the B. T. as to be occasionally fruitful of serious evils.

The B. T. of the present day has assumed enormous proportions. Authors and publishers produce new works in extraordinary numbers, while the works of older and standard authors are largely reprinted in forms to suit all classes of purchasers. The publishers take the risk, in whole or in part, of publishing many of these works, but in many cases the authors are wholly responsible. Good authors have no difficulty in finding publishers, while indifferent authors have generally to guarantee outlays. This becomes a serious matter for many authors, and exposes publishers not unfrequently to unjust charges. It is extraordinary that the ambition of authors generally is not more moderated by the heavy losses they sustain. On the other hand, at no previous period in the history of the B. T. could the body of popular authors obtain such large returns for their productions. In some cases, no doubt, this is the result of the large sales which their works command, but the competition among publishers for the works of good authors is so great, that the value of an author's MS. is often increased fictitiously. It requires great discretion on the part of the publisher to determine what books to publish, and the success of the existing houses of note is in great part due to the judgment and enterprise with which they have carried on such operations. The principal publishers in Great Britain have their headquarters in London, where, too,

are agencies of the publishers of Edinburgh, Glasgow, Oxford, Cambridge, &c. Many of these have travellers who visit booksellers in the country, and supply them with their own publications. But a very large portion of the trade is done through the wholesale booksellers, who supply the periodicals and books of all publishers to the booksellers throughout the country. Many of these receive parcels daily, some even twice a day, from London to meet the demands of their customers.

In addition to the ordinary booksellers, the railway system has called into existence the railway bookstalls as a means of distributing in large numbers all classes of books and periodicals. The enterprising house of Messrs W. H. Smith & Son, London, have the contracts for these stalls on nearly all the leading lines in the country. The canvassing department of the B. T. is also carried on to a very large extent by several houses, who have agencies placed all over the country, and who take up such works as are usually sold in parts. Another extensive branch of this department is the canvassing of books, chiefly Family Bibles in a bound form. Many thousands of these have been sold of late years to parties who paid for them by instalments.

It may be of interest to give the number of books issued in Britain for a single year, together with a distribution of them into the various departments of literature and science to which they belong. In 1875 no fewer than 3577 new books were published, and, in addition, 1320 new editions. Of the new books, 644 were contributions to fiction, 556 to theology (including sermons), 430 to art and mechanical science, 272 to history and biography, 270 to educational and classical subjects and philology, 227 to the literature of travel and geography, 217 to poetry and the drama, 129 to belles lettres (essays, &c.), 68 to law, and 68 to medicine.

The foreign and colonial B. T. is large and increasing. The chief imports into England are from Germany, France, Holland, Belgium, and the United States, those from France being about one-third of the whole. The total imports of books for 1874 amounted to £178,936. The exports in books for the same year amounted to £904,792, the trade being with all foreign countries and the Colonies. Fully one-half of the total exports are sent to Australia and the United States. An international copyright law (see COPYRIGHT) exists between England and three European countries—the German Empire, France, and Italy.

Germany. Germany is to be regarded as the birthplace of the B. T. as well as of printing, and in early times Frankfurt was the metropolis of the trade; a position, however, which has been distinctly occupied by Leipsic since the end of the 17th c. Berlin, Vienna, Nürnberg, Augsburg, and Stuttgart have also of comparatively late years risen into importance as central marts. But these, it must be remembered, are only agency centres, and have but a greater or less share of publishing. In 1871 Leipsic contained 249 book firms; and out of a population of 106,925 there were 21 book commission merchants, and 114 publishers, the majority of whom had their own printing establishments. The total number of books published in Germany in 1875 was 12,300, of which 1084 were theological, 1177 were legal and political, while the rest were mainly histories, biographies, text-books, novels, and poems. From the various publishing cities packages containing copies of new books pour into Leipsic daily, to be at once circulated again by the commissioners to the remotest parts of the empire. And so complete is the organisation of the system, that all books almost equally procure the attention of the retail sellers, on whom greatly devolves the business of bringing them under the notice of the public, while little or no expense is entailed by the publisher in advertising. The Copyright Convention has existed with England since 1846. The most famous of modern German publishers are perhaps Perthes (q. v.), Tauchnitz (q. v.), and Brockhaus. See Kichhoff, *Beiträge zur Geschichte des Buchhandels* (Leips. 1861).

France.—Paris is, as it has been from the 16th c., the great centre of the French trade, and possesses especially many publishing works on a most extensive scale. Such, for example, is the unique *Imprimerie Nationale*, noted for the magnificence of its editions. This old establishment (1640), managed at the expense and in name of the state, employs about 1000 workmen, and publishes specially legal acts and public documents, but also, and this gratuitously, such works of an unofficial character as receive the approbation of a commission under the Minister of Justice. Its command of varieties of type is perhaps the largest in the world, including the characters necessary for

the printing of works in German, Anglo-Saxon, Arabic, Georgian, Greek, Hindustani, Sanskrit, Russian, Persian, &c. The French publishers generally issue a surprising number of large and costly books in all departments of literature. They are produced regardless of outlay, and many of them are of surpassing beauty. In paper, printing, and illustration they are greatly superior to anything produced elsewhere. As examples of this we may mention Dore's *La Sainte Bible* (published at Tours), *Le Dictionnaire de l'Architecture* by Viollet le Duc, and *L'Ornement Polychrome*, &c.

The various other countries of Europe have, without exception, experienced a rapid increase of prosperity in the B. T. of late years. Belgium has now an active and growing trade, centred in Brussels, while Holland, greatly the superior of Belgium in point of productiveness, is still vigorous in the publication of Dutch literature, but has greatly lost its character, acquired in the early days (see *ELZEVIR*), for beautiful printing. Italy, the country of the immortal Aldines (q. v.), is yearly putting forth more voluminous fruits. In Egypt, also, there is a flourishing establishment at Bulac (q. v.) for printing works in Eastern languages.

America.—Like almost everything Transatlantic, the American B. T. is increasing immensely, the greatest firms being those of Lippincott and Harper. The chief publishing cities are New York, Philadelphia, and Boston. There is no copyright law between the United States and Great Britain, and one result of this is that almost every work of importance which is published in Great Britain is reprinted in the United States, frequently by arrangement with the original publisher, but probably as often not. These reprints of English works form a very large part of the B. T. in America. For many years attempts have been made by the Governments of both countries to establish an international copyright law, but the privilege of reprinting English publications, with or without nominal compensation, is so great, that the consent of the United States Government has not to this day been obtained. It may be hoped that the Royal Commission recently (1875) appointed by the British Government to inquire into the question of the copyright laws will be able to find some solution of this question. American publishers and booksellers have now formed an association, the chief object of which is to regulate the prices at which books are to be supplied to the trade and to the public. If they are successful in this, there will be hope for British publishers and booksellers attempting to do likewise. In America a fall trade-sale is annually held, at which nearly all the publishers dispose of large numbers of their publications. The system of canvassing for subscribers to their works is carried on in a most vigorous manner by most of the American publishing firms. See *English Catalogue of Books* (Sampson Low & Co., 1863-74), *A History of Booksellers* (Chatto & Windus, 1875), and a *Reference Catalogue of Current Literature* (Whitaker, 1875).

Book'um Wood, Bukk'um (or Wukkum) Wood, or Seppan, the wood of *Casalpinia Sappan* (natural order *Leguminosæ*, sub-order *Casalpinizæ*), a native of India, which is used for dyeing red. The roots of the same tree, under the name of yellow wood, or sappan root, are used in Ceylon for dyeing yellow. It is also exported to Britain and other countries.

Boole, George, one of the most famous of modern mathematicians, was born at Lincoln, November 2, 1815. His father, though a tradesman of very limited means, was a man of thoughtful and studious habits; and from him B. received his instruction in elementary mathematics. After being an assistant-teacher for four years, during which he made himself proficient in ancient and modern literature, he opened a school in Lincoln when only twenty years of age. From this time his special study was mathematics. In 1839, his memoir, entitled *Researches on the Theory of Analytical Transformations*, was published in the *Cambridge Mathematical Journal*; and in 1844 he received the royal medal of the Royal Society of London for his paper *On a General Method in Analysis*. In 1847 the attention of B. was attracted to the subject of mental science, from the controversy between Sir W. Hamilton of Edinburgh and Professor De Morgan; and in the same year appeared his *Mathematical Analysis of Logic*. In 1849 he was appointed Professor of Mathematics in Queen's College, Cork, a position he held till his death. His most elaborate work, *An Investigation of the Laws of Thought*, was published in 1854; and in 1854 he received the Keith medal

of the Royal Society of Edinburgh for his memoir *On the Application of the Theory of Probabilities to the Question of the Combination of Testimonies or Judgments*. B. died at Ballintemple, 8th December 1864. As a pure mathematician he is well known by his numerous memoirs and his works on *Differential Equations* and *Finite Differences*, and also through his development of that method of solution of equations known as the separation of symbols.

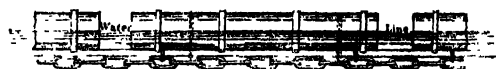
Boomerang, a remarkable hunting instrument and weapon used by the aborigines of Australia. It is parabolic in shape,



Boomerang.

made of hard wood, and from 2 feet to 2 feet 8 inches in length, the average length being about 2 feet 4 inches. It is $\frac{2}{3}$ inches broad and one-third of an inch thick. The ends are rounded, and one of the sides is convex, the other flat. The B. is held by one end, with the convex side downwards, and thrown in the opposite direction to the object aimed at. It rises into the air with a gyratory motion and whizzing sound, and at length stops, then commences to return, and falls behind the user. The Australian blacks are very skilful in its use, but Europeans have never been able to master it. The B., although not known even to the aborigines of Tasmania, was used by the ancient Egyptians, and has also been traced by Colonel Lane Fox (*vide Report of the British Association*, 1872 meeting) to the Dravidian races of the Indian peninsula, whom Professor Huxley refers to an Australoid stock. The Dravidian B. differed from that now used in Australia in being thicker and heavier, and in not returning. In N. America, Dr E. Palmer has discovered that the B. is used by the Moqui Indians of Arizona and New Mexico to kill rabbits. They throw it with a motion similar to that by which a stone is made to skip on the surface of the water. Still more recently the B. has been found in use among some of the Indian tribes of California.

Boom, in a ship, the pole or yard to which the lower edges of some of the sails are attached or stretched. It receives the name also of the particular sail to which it is attached—e.g., *jib-B.*



Harbour Boom.

B., in harbours, a chain stretched across an entrance to prevent ingress of hostile vessels. B., in girder bridges, the upper and lower members or flanges of the girders.

Boom, a market-town in the province of Antwerp, Belgium, 11 miles S. of the city of Antwerp, on the navigable river Rupel, with some manufactures of leather, beer, ropes, sailcloth, and salt. Pop. (1873) 9508. It has the most important brick-kilns in Belgium, 12 corn-mills, 7 wharves, &c.

Boone, Daniel, the pioneer of the white settlers in Kentucky, was born in Pennsylvania, February 1735. He afterwards resided in N. Carolina, and there married; but, inspired by a love of nature and a fondness for adventure, he crossed the Alleghenies in 1769, and reached a branch of the Ohio called Kentucky. On its banks, in 1775, he built a fort named Boonesborough. Twenty years later he removed to Missouri, where he died, September 26, 1822. Kentucky, which owes so much to him, has ever held his memory in the highest respect, and his remains were finally interred with much pomp in Frankfort, the capital of the state. B. is the typical backwoods hero of all American youth.

Boonesborough, a small village in Madison county, Kentucky, U.S., founded by Daniel Boone, where he built the first fort in the state, in 1775. It stands upon the banks of the Kentucky river, above Frankfort, and near to Lexington. Here met the first state legislature W. of the Alleghenies.

Boot, an instrument of judicial torture, formerly used by the Privy Council and the Justiciary of Scotland to extort confession or

evidence. It consisted of a cylinder of iron rings, or of a wooden box, in which the leg was placed, wooden wedges being hammered in between the leg and the B. Shields, in a *Hind let Loose*, says this was done 'till the marrow came out of the bone.' The limb was often rendered useless. In 1579 the B. was inflicted on a clergyman and notary, false witnesses to a solemn deed. In 1583, Walsingham ordered Holt the Jesuit to undergo the B. in Scotland, and next year he ordered the same torture for Hurley the Jesuit, suspected of complicity in the Desmond rebellion. The cases of Fian (1591) and Balfour (1596) involved charges of witchcraft and murder. In Grant's case (theft and robbery, 1632), the plea that Grant, having passed the ordeal, should be set at liberty, was repelled. Except in extraordinary cases before the council, the B. was not used before the jury, but by way of precognition; what the prisoner confessed was afterwards proved at his trial. In Covenanting times the B. was used in the politico-military trials—e.g., Hugh M'Phail's. On the murder of President Lockhart (1689), and in Payne's case (the Montgomery Plot, 1690), the B. was used; in the latter case along with the thumb-screws, at the express desire of William III. The Claim of Right (1689) declares 'that the using torture *without evidence, or in ordinary crimes*, is contrary to law.' All torture was abolished by 7 Anne, c. 20. M'Laurin states the B. was brought from Russia: it was a new thumb-screw, which Drummond and Dalziel imported during the persecutions. The French *brodequin* resembles the B.

Boötēs (Gr. 'ox-driver'), according to the Roman mythographer Hyginus, was originally called Philomelos, and was the son of Ceres and Iasion; when he saw himself robbed of all his property by his brother, Plutos, he invented the plough, to which he yoked two steers, and began to till the ground. As a reward for this invention, he was, along with his plough and oxen, translated by his mother to the stars. According to another version of the myth, B. was the son of Lycæon and Callisto, and was placed by Zeus among the constellations, one of which, Arcturus, received his name.

Booth, a temporary structure of boards, boughs of trees, canvas stretched on a wooden frame, or other light material. The



Booth.

etymology is disputed, some deriving it from the Gaelic *both* or *bothag*, a bothy, or hut, others from the Greek *apothekē*, a magazine or storehouse, whence unquestionably the French *boutique*. But there is more probability in the conjecture that the word is of Teutonic origin, and connected with the Old Eng. *buan*, to dwell, Ger. *baun*, to build. It is the same as the Dan. *by* (in Normandy *buc* and *bauf*), a dwelling-place. The prevalent Lowland Scotch form is *booth*. Booths, set up in a locality at the annual fair where the trade of the district was mainly transacted, were necessarily removed when the fair was ended; but when weekly markets superseded the annual fairs, the booths were often allowed to remain during the intervals, and gradually became permanent. Encroachments were thus made on the recesses of buildings, and even on the streets of towns; and the early monkish chroniclers are loud in their complaints against the appropriation of sites by stall-keepers without authority received from the superior. Licence to get out a stall frequently resulted in liberty assumed to build a house on the spot. In this way, according to Stow, arose Old Fish Street, London, and part of Cheapside. The *luckenbooths* in the centre of the High Street, Edinburgh, arose in similar fashion. The shed, at first movable, in time got attached to the wall of some cathedral or town-house, soon came to have a 'solar' or loft above it, in which the tradesman resided, and a cellar beneath it in which he stored his goods. Booths must now be licensed; if not, they are public nuisances, and subject those who erect them to punishment by

fine. But at fairs, if sanctioned by the local authority, they are still within the statute 6 and 7 Vict., c. 68, s. 23, if confined to histrionic spectacles.

Booth, Barton, a famous actor, related to the Earls of Warrington, and born in Lancashire, 1681. He was educated at Westminster, and afterwards at Cambridge University, but ran away at the age of seventeen, and became a strolling player. He played successfully at Bartholomew Fair and at Dublin, and finally (1701) made his appearance at Drury Lane, then under Betterton, where he soon became a great favourite, especially with the court and aristocracy. Among his chief parts were Othello and the Ghost in *Hamlet*, the impressiveness of his acting rendering the latter a wonderful performance. He also gained great praise in the rôle of Addison's *Cato*. On the first night on which the tragedy was performed, a purse of fifty guineas was collected in the boxes, and presented to the actor 'for his honest opposition to a perpetual dictator, and his dying so bravely in the cause of liberty.' After having succeeded Betterton as manager, he died May 10, 1733.

Boothia Felix, a peninsula on the N. of the American continent, bounded on the N. by Bellot Strait (q. v.). It was named after Sir Felix Booth by Sir John Ross, who discovered it, and supposed it to extend to Barrow Strait.—B., Gulf of, separates B. F. from Cockburn Island on the W.

Boots. (The word 'boot,' it may be noticed, is of Teutonic origin, being the Ger. *bütte*, whence the Fr. *botte*, and the Ital. *botta*, a 'butt,' or 'leathern bottle.' The transition from the leathern bottle to 'boot' is not peculiar to French; the Eng. 'boot' is used to signify both foot-gear and the luggage-box in a stage-coach.) Modern B. are strong, durable coverings for the feet, made of tanned leather, always reaching above the ankles, and sometimes extending to near the knees. There is considerable variety in their forms, and in the mode in which they are fastened to the feet, the most recent and now generally adopted fashion being by elastic-web gussets in the sides. Further details regarding bootmaking will be given under SHOES and SHOE-MAKING.

B. are of comparatively modern introduction, and appear to have gradually come into use after the Norman conquest. In *Les Mœurs, Costumes, et Usages au Moyen Âge* of Lacroix, an illustration of the 13th c. occurs, in which long B. like Hessians are seen. From the time of Edward IV. onward, long B. came into common use for gentlemen. The B. worn at this period were drawn out in front to long tapering points, and when this fashion was prohibited by law, the shape ran into an equally absurd breadth of toe, which in its turn had to be restricted by legal enactment. About the period of the Reformation, B. were worn wide at the top, and having a piece folded back which could be pulled up considerably higher than the knee. The courtiers of the time of Charles II. wore an edging of costly lace round the widely-expanded top of the B. then in fashion. The jack-boot came into use in the time of James II.; the Hessian was introduced during the reign of George III., and top-B. came into fashion about the end of last century. Wellingtons were introduced by the great Duke to supersede Hessians, and were worn under the trouser-leg.

Boot'y. This is technically a military term denoting the property taken in war. The corresponding naval term is *Prize* (q. v.). Nominally the property of the sovereign, B. is always divided among the captors. The officers and the field-officers appoint agents, who sell the captured property, and hand the proceeds to the authorities. A scheme of apportionment is then made out, in accordance with a list of those entitled to share, previously sent in by the commanding officer, and the money is paid accordingly.

Bopp, Franz, a distinguished Sanskrit scholar, was born at Mainz, September 14, 1791. From an early age he devoted himself to the study of Oriental languages, and continued his labours in that department at Paris, London, and Göttingen. He published a work on the Sanskrit verb, a Sanskrit grammar, a complete system of the Sanskrit language, a Sanskrit vocabulary, fragments of the *Mahabharata*, and a comparison of the Celtic languages with Sanskrit, &c. In 1821 he was appointed Professor of Oriental Languages at Berlin. His *Vergleichende Grammatik des Sanskrit, Zend, Griechischen, Lateinischen, Lithauischen, Altslavischen, Gotischen, und Deutschen*

(Berl. 1833-53; 2d ed. with the relations of the Armenian, 3 vols. Berl. 1856-61; 3d ed. 1868), may be said to have laid the foundation of the science of comparative philology. The first edition was translated into English by Eastwick (1845-50). B. died 22d October 1867.

Boppard, a town of the Rhine province, Prussia, 9 miles S. of Coblenz by rail, with several active industries. It is the ancient *Baudobriga*, was in the middle ages an imperial city, and still contains the ruins of the Roman fortress built by Drusus. Near it is Marienberg, the celebrated hydropathic resort. Pop. (1871) 2610.

Boquetin, or **Ibex of the Alps** (*Capra Ibex*), a species of goats inhabiting the lofty mountain ranges of the Alps and other European mountains, at a higher range than the Chamois (q. v.). It is named 'Steinbock' in German Switzerland. The ibex is of the size of an ordinary goat. The winter coat consists of long rough hair, covering a finer under-wool, which forms the summer coat. The head is small, but the horns are very large, curved upwards and backwards, and possess prominent cross-bars on their front surfaces. The horns of the female are very small as compared with those of the male, which may attain a length of 2 feet. The colour is light, brown above and white beneath, a black band existing on the back, and a brown line crossing the flanks. The tail is short. A small, rough, black beard is developed. The food consists of herbage, shrubs, and lichens. These animals are very active, and exercise a keen sense of smell, and of sight also. They execute considerable leaps, and may even escape uninjured, when pursued, by leaping from heights that would ensure the destruction of less agile animals. If hard pressed, the ibex may charge the hunter. These animals are readily domesticated, and will breed with the common goat. The hybrid progeny will breed with either the ibex or the goat.

Bora, Katharina von, the wife of Luther, was born at Löben, in Saxony, 29th January 1499. While very young she was placed in the convent of Nimptschen. On reading some of the writings of Luther, she determined to abandon a monastic life, and, along with eight of her companions, she applied to Luther for help. Leonhard Koppe, a citizen of Torgau, at the instance of Luther, succeeded in effecting their escape on the night of 4th April 1523. Katharina found an asylum in the house of the burgomaster Reichenbach, at Wittenberg, and was married to Luther, 13th June 1525. This marriage proved eminently happy; and Luther in his will left all his property to her, whom he playfully termed *Catha mea* ('my Katie'). She died at Torgau, 20th December 1552. See Walch's *Geschichte der Kath. von B.* (2 vols. Halle, 1752-54), and Beste's *Geschichte Kath. von B.* (Halle, 1843).

Boric Acid is a white crystalline substance, which in the anhydrous condition is simply an oxide of the element *Boron*, having the formula B_2O_3 ; but in the hydrated states is a compound of oxide of boron and water, $B_2O_3 \cdot 3H_2O$, or $B(OH)_3$. It was discovered in 1702 by Homberg (*Homberg's sedative salt*), but it is supposed that the *chrysoscolia* of Pliny was the same substance. It occurs in the uncombined state in the crater of *Vulcano*, one of the Liparic islands, but is obtained in largest quantity from the *soffioni* or jets of vapour which issue from the ground in many parts of Tuscany. The *soffioni*, or *fumerolles*, containing, in addition to hot aqueous vapour, sulphuretted hydrogen and a small quantity of B. A., are directed into *lagoons* or ponds of water; the water takes up the B. A., and becomes heated to the boiling-point. The lagoons are arranged in such a manner that the water from the highest can reach the lowest after passing through the intermediate ones. The water is allowed to remain in each lagoon for from twenty to thirty hours, and finally contains from $\frac{1}{2}$ to 2 per cent. of B. A. It is then led into a series of shallow evaporating cisterns, made of lead, and heated by the *fumerolles* themselves, when it becomes sufficiently concentrated for the B. A. to crystallise out on cooling. Tuscany yields about 2,500,000 lbs. annually. B. A. combines with various bases to form a class of salts called *Borates*, the most important of which is the *Bi-borate of Soda*, or *borax*, $Na_2B_4O_7$. A few of them occur native as minerals, but are unimportant. B. A. is employed as a flux in the preparation of certain kinds of glass, and as an antiseptic dressing for wounds. It is chiefly employed in the manufacture of borax.

Borage (*Borago*), a genus of plants of the natural order *Boraginaceae* (q. v.). They are all rough, hairy annuals or biennials, with blue flowers in loose spirally coiled cymes. There are few species, and these chiefly from N. E. Europe and Western Asia. There is only one British species, the common B. (*B. officinalis*), which is doubtfully indigenous, and is probably originally an escape from gardens in which it was introduced long ago from the E. Mediterranean region. The young leaves and shoots are pickled, and sometimes served as a table vegetable; but beyond the range of the domestic pharmacopoeia, B., at one time held in great renown as a remedy in pectoral affections and as an exhilarant, is esteemed of little value as a medicinal plant.

Boraginaceae, or **Boragineae**, a natural order of dicotyledonous plants, to which *Echium*, *Mertensia*, *Lungwort*, *Hounds-tongue*, *Borage*, *Alkanet*, *Forget-me-not*, &c., belong. It is a numerous order, comprising nearly 58 genera and 700 species, chiefly natives of the northern hemisphere, and having but few representatives in the tropics or in the southern hemisphere. It differs from all the allied orders except the *Labiata* (q. v.) by the four-seeded nut, and from these by their alternate leaves and more regular flowers. The plants of the order are chiefly remarkable for their mucilaginous properties. Nearly all are harmless, and are of little value as medicinal agents. *Alkanet* (*Anchusa tinctoria*) roots yield a dark blood-red dye. The young shoots of Comfrey (*Symphytum officinale*) are eaten as a vegetable, and are a good substitute for spinach. The root contains much starch, and when scraped and laid on calico it forms a good bandage for wounds. Several plants of the order—e.g., *Sweet Heliotrope*—are cultivated in our gardens.

Bora Samba, a small half-independent Indian state, on the S.W. frontier of Bengal, paying an annual tribute of £16 to the British Government. The country is rugged, with an area of about 620 sq. miles; the pop. is estimated at 28,000.

Borassus. See PALMYRA PALM.

Borax is a colourless crystalline compound of boracic acid and soda. It occurs native in China, Persia, Ceylon, Peru, and on the shores of certain lakes in Thibet. Crude B. from the latter locality is called *Tincal*. B. is now principally prepared from the boracic acid of Tuscany, by neutralising a solution of that substance with one of carbonate of soda, and evaporating to crystallisation. If it be allowed to crystallise from its aqueous solution at a temperature of 25-30° C. it separates in prismatic forms (ordinary B.), and contains 10 molecules of water of crystallisation, its formula being $Na_2B_4O_7 \cdot 10H_2O$. If the crystallisation takes place at 56-79° C., the B. is octohedral in shape, and contains only half as much water of crystallisation, its formula being then $Na_2B_4O_7 \cdot 5H_2O$. B. is valuable to the chemist as a blow-pipe reagent. When strongly heated, it parts with its water of crystallisation, and fuses to a clear glass, which has the property, at a high temperature, of dissolving many metallic oxides, and forming coloured and characteristic compounds (*B. beads*). It is also used as a flux in soldering metals, as it protects their surfaces from oxidation, and at the same time dissolves any oxide that may be present. In the arts B. is employed in the manufacture of certain kinds of glass, enamel, and porcelain. It is used in medicine both as an internal and external remedy.

Borda, Jean Charles, an eminent French mathematician and astronomer, celebrated for many ingenious inventions and improvements, was born at Dux, May 4, 1733, and died at Paris, February 20, 1799. His scientific reputation rests chiefly upon his corrections of the seconds pendulum, and his improvement of the reflecting circle.

Bordeaux, a beautiful city, the capital of the department of Gironde, France, on the left bank of the Garonne, 60 miles from its mouth in the Atlantic, and 310 miles S.W. of Paris by railway. It consists partly of an old town, chiefly composed of dilapidated wooden houses of the 15th c., and of more modern portions laid out in regular streets, open squares, and beautiful boulevards. The principal buildings are the Cathedral of St André, commenced in the 11th c.; the Town-hall, partly destroyed by fire in 1875; the fine old churches of St Croix, St Seurin, and St Michel; the beautiful quadrangular clock-tower of Pey-Berland; a palace built by Napoleon in 1810; the Exchange; and the theatre (1777), one of the best in France.

There is here an *Académie Universitaire*, with fifteen professors, which took the place in 1839 of the old university, founded by Pope Eugenius IV. in 1441; also an academy of arts and sciences, established in 1712; many educational institutions and learned societies; one of the richest museums of precious stones in France; and a public library of 140,000 volumes. B. is connected with the suburb of La Bastide, on the right bank of the Garonne, by one of the finest stone bridges in Europe, erected by Deschamps the elder (1811-21). It is 532 yards long, and spans the river in 17 arches. B. is accessible by the Garonne at all times to ships of 600 tons, and at high tide to vessels of over 1000 tons; while by the Canals d'Orléans and Du Midi it has communication with the S. of France and the Mediterranean. It has regular packet service with Holland, England, the W. Indies, Brazil, and Australia. Its chief exports are the famous B. wines (see CLARET), brandy, vinegar, hams, glass bottles, turpentine, and dried fruits. There are also manufactures of sugar, liqueurs, printed calicoes, woollens, carpets, paper, nitric acid, and earthenware. Pop. (1872) 182,727.

Under the name *Burdigala*, of which B. is but the modern form, it was the emporium and port of the *Bituriges Vivisci*, and became a great commercial city under the empire. After the division of Aquitania into provinces, it obtained the title of *metropolis* of Aquitania Secunda. Ausonius the poet, who was born here, gives numerous descriptions of the city in his verse. The first Christian church was planted at B. in 272 A.D. The city passed successively into the hands of the Vandals, the Visigoths, and the Franks. Sacked by the Spanish Arabs in 732, it was reconquered by Charles Martel in 735. Charlemagne appointed a *Comes* (Count) of B. in 778. The city was repeatedly plundered by the Normans in the 9th c., and only began to recover in the 10th c. For nearly two centuries it continued to be ruled by the Dukes of Guienne, till the marriage of Eleanor of Guienne with Henry II. of England in 1154. It remained in English possession for three centuries, but was ultimately taken by Charles VII. of France, October 17, 1453. By resisting the salt-tax in 1547, B. incurred the bloody vengeance of the Constable Montmorency, and it was also the scene of a terrible massacre of the Huguenots in 1572. In the time of the Revolution, B. was conspicuous as the headquarters of the Girondists; and subsequently it was the first town (1814) to favour the return of the Bourbons. During the German war the Provisional Government was forced to retire from Tours to B., where a National Assembly, summoned by the Provisional Government in Paris, met, 13th February 1871, for the purpose of negotiating a peace, and continued to meet till March 20, when it was transferred to Versailles. See O'Reilly's *Histoire Complète de B.* (2 vols. Bord. 1853-60).

Bordelais, a district in the old province of Guienne, France, now included in the departments of Gironde and Landes. The name is still applied to the inhabitants of Bordeaux, formerly capital of B.

Border, a tract of territory lying on both sides of the frontier line between England and Scotland. This tract was variable at different epochs, as the fortunes of the war that raged between the two countries from the 11th to the 17th c. added to or diminished the frontier territories of either country; but it may be said to have always included those wild and lonely tracts, sometimes grassy, but often rugged, and impassable to all horsemen save those born and bred among their mosses, streams, and ravines, which still form so characteristic a feature of the region. In 1138 David I. (q. v.) of Scotland marched southward to assert his right to the province of Northumberland, of which his son was heir by inheritance, but was defeated and slain at the Battle of the Standard (q. v.). In 1157, Malcolm IV. (q. v.) agreed to give up any claims he might have to Northumberland and Cumbria, though on the same occasion he was reinvested in the honour and Earldom of Huntingdon. Malcolm's successor, William the Lion (q. v.), demanded restitution of Northumberland, and being captured in open war on English ground, was carried to Falaise in Normandy, and only released from captivity by signing the treaty of Falaise in December 1174, in which the Scottish king agreed to do homage in the future for the kingdom of Scotland to the King of England. This acknowledgment of feudal superiority was formally abandoned by Richard Cœur de Lion. On the accession of Alexander II. to the Scottish crown, an attempt was made to annex the northern provinces of England to Scotland, and

after invasion of each other's territories by both kings, the discussion of the claims on the Northumberland districts was proceeded with till 1237, when Henry III. agreed to give the Scots certain manors in Cumberland and Northumberland, not in sovereignty, but in feudal property,—an offer which was accepted. From this time the efforts of the Scots to extend their frontiers ceased, and the boundary of the two kingdoms began to be distinctly and permanently recognised. Thus, though the actual frontier of the kingdoms varied at different periods, the district which we now know as the B. has been the B. throughout all historical time. It has been said of Scotland that no country in the world is marked with so many battlefields, and it may be added that no district of Scotland is marked with so many sites of battle and foray as the B. The contests of the neighbouring kings led of necessity to frequent battle and constant feud between neighbouring B. families; and the history of the district, when it is not strictly a part of the history of Scotland, is mainly a record of deliberate battle, or sudden attack and reprisal. Yet the story is chequered with the tenderest passages. Between son and son of two hostile families the traditional hatred of their race was maintained; between son and daughter a different feeling was sometimes engendered, and the 'sad wooing' of young people belonging to the 'Capulets and Montagues' of the Scottish B. has formed the theme of many pathetic Ballads (q. v.). Ridpath (*B. History of England and Scotland*) gives a very curious account of a number of articles drawn up by a joint-commission from the two kingdoms, in 1248, respecting the 'B. laws and customs,' the first of which articles was to the effect, 'that any subject of Scotland (or England) accused of committing robbery, theft, homicide, or any other crime that ought to be tried by single combat, shall not be obliged to answer in any other place but in the marches of the two kingdoms,' or in the B. In 1603 James I. of England, in pursuance of his purpose of extinguishing the hostilities between the B. families, forbade the use of the name of *The B.*; and commanded that thenceforth the name of the 'Middle Shires' should be applied to the counties on the frontier. See Scott's *B. Antiquities and Minstrelsy of the Scottish B.*, Chalmers's *Caledonia*, and J. Hill Burton's *History of Scotland* (1867). In recent times the districts of the B. are being in great part laid out in sheep farms, and under cultivation; the whole region is losing to a great extent the savage and gloomy appearance it wore before its slopes had ever been made 'blythe by plough and harrow.' The moor and moss country of the lower slopes of the Cheviots in Roxburghshire—formerly the 'impenetrable haunt of moss-troopers'—is rapidly being converted into arable land. See Howitt's *Visits to Remarkable Places*.

Border Warrant is a warrant issued by the Judge Ordinary on the border between England and Scotland on the petition of a creditor, to arrest the person or effects of a debtor on the English side, and to detain him until he find security for his appearance in any action which may be brought for the debt within six months, and for his abiding the result of it.

Bordure, one of the subordinaries in heraldry, and a mark of Cadency (q. v.), is the border of a shield. It is borne plain or charged, and in it reference may be made to the profession of the bearer. Thus a judge's shield might appropriately show a B. ermine, and a soldier's a B. embattled.

Bore, a phenomenon observable in the estuaries of certain rivers, due to the tidal wave from the sea being impeded by the gradually narrowing channel, thus giving rise to a kind of watery ridge stretching across the stream, and travelling upwards with great velocity. The most celebrated bores are those of the Ganges, Brahmaputra, and Indus, though the phenomenon is also seen well in the case of some of our own rivers.

Bore, the internal cavity of a cannon, rifle, gun, pistol, or other kind of firearm. In some kinds of cannon, and in shot-guns, the B. is cylindrical, while in others and in modern small arms it is furrowed by spiral grooves, or in other words rifled. Technically the B. is the diameter of the cavity, and in the case of rifled arms the mean diameter is taken as the B. The B. of shot-guns and small arms was formerly regulated by the number of spherical bullets fitting the cavity that were in a pound weight; for example, the Enfield Snider rifle would have been called 24-B., because twenty-four spherical leaden bullets fitting the barrel would weigh one pound.

Boreas, in Greek mythology, the god of the north winter wind, son of Astræus and Eos, and father of Zetes, Calais, and Cleopatra (hence called Boreades), by Orithyia, daughter of Erechtheus, king of Attica. Remembering this connection, B. (according to the Greek belief) answered the prayer of the Athenians by scattering the fleet of Xerxes near Cape Sepias. In token of gratitude, an altar was erected to him at Athens, and a yearly festival (*Boreasmas*) celebrated in his honour.

Borecole. See KALE.

Borelli, Giovanni Alfonso, a celebrated Italian mathematician, was born at Naples, January 28, 1669, and died at Rome, December 31, 1709. He wrote thirteen treatises, of which the most famous is *De Motu Animalium* (2 vols. Rome, 1680-81; Leyden, 1710), being the application of the laws of mechanics to the motion of animals. B. foreshadowed Newton's law of gravitation in his investigations of Jupiter's satellites.

Bo'rer, a name applied to the *Myxine* or *Hag-fish* (q. v.).

Bo'rer, the name given to certain beetles of the genus *Anobium*, to which genus the familiar 'Death-watch' (q. v.) belongs. The latter insect, indeed, in its caterpillar or larval state, bores into wood, and thus destroys furniture of all kinds. They belong to the tribe *Pentameræ*, the members of which possess five joints in their tarsi. The jaws in these larval insects are of strong make, and constitute the boring organs; and the larvæ reside in the burrows thus formed during their pupa state, emerging therefrom as the perfect beetle or *imago*. One species, *Lymexylon navale*, burrows into and destroys oak timber, and thus does great damage in dockyards. It is chiefly found in N. Europe.

The name 'B.' is also applied to certain *Lamellibranchiate* shell-fish or *Mollusca*, which bore into rocks by means of their shells. Of these latter forms, the *Pholas* (q. v.) or Piddock, the *Teredo* (q. v.) or Shipworm, &c., are familiar examples.

Borghese, a distinguished Roman family, originally of Sienna, where it occupied the most important positions from the middle of the 15th c. The foundations of its greatness at Rome were laid by **Camillo B.**, elected pope in 1605, with the title of Paul V., who loaded his relatives with wealth and honours. From his nephew, **Marco Antonio B.**, who died in 1658, is descended the present B. family. It greatly enriched itself by fortunate marriages, especially with the Aldobrandini, Spinola, and Colonna families. **Camillo Filippo Ludovico B.**, Prince of Sulmona and Rossano, was born at Rome, 19th July 1775. In 1803 he married Pauline, sister of Napoleon Bonaparte, was created Duke of Guastalla, and became for a time governor-general of the Transalpine provinces. He separated from Pauline after the fall of her brother; and died at Florence, 10th April 1832. The magnificent *Villa B.*, near the *Porta del Popolo*, at Rome, was built by Scipione Caffarelli B., in the 17th c., and had formerly a splendid art collection, now mainly to be found in Paris. The *B. Palace* is also one of the finest in Rome.

Borghesi, Bartolommeo, Count, an Italian antiquarian and numismatist, was born at Savignano, near Rimini, 11th July 1781. From an early age he devoted himself to archaeological studies, and arranged the collections of coins and medals in Milan and the Vatican. In 1821, B. withdrew to the little republic of San Marino, where he died, 16th April 1860. The French government undertook the publication of his complete works, of which 7 vols. appeared 1862-71. His principal work is *Nuovi Frammenti dei Fasti Consolari Capitolini Illustrati* (2 vols. Mil. 1818-20). B. was a corresponding member of the Institute of France, and an Associate of the Academy of Berlin.

Borgia, the name of a Spanish family, the first important personage in which is **Alfonso B.**, Pope Calixtus III. (1455-58), who endeavoured to unite Europe against Mohammed II. His nephew by a sister, who married Godfrey Lenzuolo of Valencia, was **Roderigo B.**, born in 1431, who, at first an advocate and soldier, was appointed by his uncle Archbishop of Valencia and Cardinal S. Nicolo; was sent by Sixtus IV. to Spain to settle the Castile succession, and, on the death of Innocent VIII. in 1492, was elected through shameful bribery Pope Alexander VI. (q. v.). By one of his mistresses, named Rosa Vanozza, Roderigo had several children, of whom Cesare and Lucrezia B. are best known.

CESARE B., whom in his *Principe* and the *Descrizione del Modo tenuto dal Duca Valentino* the contemporary Machiavelli (for three months an ambassador from Florence to B.) quotes as a model of political sagacity, was appointed by his father Archbishop of Valencia. On the marriage of his brother Giovanni (Duke of Gandia) to Sancia of Aragon, he obtained a grant of money from Alfonso of Naples; and soon became Cardinal Valenza. He was given as a hostage to Charles VIII. on his march to Naples. Cesare now wished to pursue a scheme of his father's for obtaining the lands of the Roman nobility, which was to be carried out by destroying the Colonna, Savelli, and Orsini families. To this end money was required. Cesare therefore murdered the Duke of Gandia, and obtained the duchy of Benevento. In 1498 he carried to the court of France the papal divorce which permitted the marriage of Louis XII. with Anne of Bretagne, widow of Charles VIII. For this he was made Duc de Valentinois. Next year he married Carlotta, daughter of Jean d'Albret, King of Navarre. With the help of French troops, furnished under the treaty between France, Venice, and the Pope of 15th April 1499, Cesare in the beginning of 1500 reduced Imola and Forlì in the Romagna, and was made Gonfaloniere of the Church. Pesaro, Rimini, and Faenza were soon afterwards occupied, and the Florentines were compelled to appoint him their Condottiero, with a large annual tribute. After assisting Louis XII. in the joint-occupation of Naples, Cesare, whom his father had made Duke of Romagna, successfully attacked Piombino and Urbino, and would have occupied Florence, if the French king had not intervened. The blame of this expedition he skilfully threw on Orsino, Gravina, and others who were his allies, and whom he shortly afterwards, during their joint-attack on Sinigaglia, treacherously murdered. The death of Alexander VI. in 1503 stopped the success of Cesare. The Roman nobles combined against him; his newly-acquired dominions (except some districts in the Romagna, where he had instituted 'a system of justice') revolted, and the election of Julius II. decided his departure from Rome. After an attempt to raise forces at Naples, B. was imprisoned by Ferdinand of Spain in the castle of Medina del Campo. Escaping at the end of two years, he entered the army of Navarre, and was killed at Vienne in 1507. B.'s skill in diplomacy and war was greatly enhanced by his systematic and heartless treachery, a quality, however, which was very common among the leading Italians of the time. Fuller has called him 'the practical atheist.' (The Italian Life of B. is by Tomasi; there is one in English by Gordon. See also Roscoe's *Leo X.*, vol. i.)

LUCREZIA B., born in 1478, was married in 1493 to Giovanni Sforza, Lord of Pesaro, grand-nephew of Ludovico Sforza of Milan. Divorced from him, in 1498 she married the Duc de Bisceglie, a natural son of Alfonso II., receiving as dowry from her father Spoleto and Sermoneta. The Duke was murdered in 1500. After assisting her father in public business for a time, Lucrezia was married in 1501 to Alfonso of Este, son of Ercole, Duke of Ferrara, whose first wife, Anne Sforza, had died. Lucrezia's son by this marriage succeeded his father in Ferrara as Ercole II. At the court of Ferrara, where Ariosto, the Strozzi, Cicco, Bembo, Frissino, and Aldo Manuzio then lived, and where Boiardo had just died, Lucrezia's behaviour seems to have been worthy of her patriotic and virtuous husband. She organised charity, and promoted religion, and frequently in the absence of the Duke administered public affairs. In the wars of the Cambrai League and of Pope Julius II. against Ferrara she often distinguished herself by her courage and her sympathy with the people. She died 22d June 1519. The legend of Lucrezia's vices has been skilfully wrought up by a Neapolitan poet and a Neapolitan historian (Sarmazaro and Gulicciardini), and has become the subject of Victor Hugo's magnificent tragedy. The historical evidence does not support the charge of double incest brought against her, and makes it certain that her later life was free from blame. (The most recent Italian Life is by Zuchetti, published at Mantua in 1860. See also Gilbert's *Life of Lucrezia B.*, and that of Gregorovius in German (1879). The most trustworthy account of the B. family is contained in the despatches of Antonio Giustiniani, Venetian ambassador in Rome from 1502 to 1505, edited by Professor Villari (Flor. 1875).)

Bor'go (Ger. *burg*, Eng. *borough* and *burgh*), the name of many villages and towns in Italy, the most important of which

are—1. **B. San Donnino**, a walled town, province of Parma, on the railway between Parma and Piacenza. It is a bishop's see (1501), and has a cathedral, with some remains of mediæval sculpture, several convents, a college, a gymnasium, and manufactures of silk, linen, and woollen fabrics. Wine and oil are produced in the neighbourhood. Pop. about 6000. It is named after a military saint, said to have been martyred here in 304 A.D.—2. **B. Taro**, a walled town in the province of Parma, N. Italy, situated on the Taro, a tributary of the Po, 35 miles S.W. from Parma. Pop. 6938.—3. **B. Manero**, a walled town, province of Novara, with a cathedral, two convents, and some manufactures. Pop. 6000. There is also **B.** in Finland, at the mouth of a river of the same name, with a considerable trade. Pop. 3182.

Boring. The tools used for this operation, and the mode of conducting it, vary altogether according to the nature of the material to be pierced. The principal tools used in the **B.** of timber or woodwork—the auger and the brace-and-bit for large holes, the gimlet and bradawl for smaller ones—are too well known to need description.

B. in metals is carried on either by *drills* or by *B.-bars*, the piece to be bored being fixed upon or beside a drilling or **B.** machine, by which the tool is caused to revolve. Drills of some kind are the tools commonly used when a hole has to be pierced, *ab initio*, through a solid. They are made of steel, and (in the form most commonly used) have one end to fit a socket in the machine, and the other flattened and pointed like a flat **V**, the two sides of which are bevelled slightly so as to form cutting edges. The greatest width of the **V** is the diameter of the hole to be bored. Steam cylinders and many other parts of machinery are cast or forged hollow, and in these cases the **B.** is only the removal of the skin of the metal so as to form an accurately cylindrical surface. Here one or more steel **B.** tools are fixed either directly upon a cylindrical spindle called a **B.-bar**, or upon a disc attached to it, the whole receiving a continuous rotation from the machine. In both the systems of **B.** mentioned, the mechanism is so arranged that the tool receives a forward motion simultaneously with the rotatory one, and it is thus caused to come into contact continually with fresh portions of material.

B. in earth or rock for geologic or engineering purposes is carried on principally with three classes of tools—augers, worms, and jumpers. Augers are used for **B.** through ordinary soils, clay,

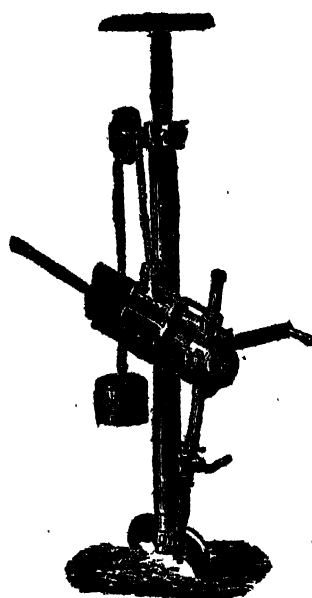
gravel, chalk, and the softer rocks. They are in form hollow cylinders of wrought iron, steeled, generally about 3½ inches diameter and 18 inches long, having a sharp-edged slit down one side. The width given to the slit and the form of the lower end of the auger varies with the nature and hardness of the material to be pierced. On lifting the auger out of the hole, it brings with it the fragments of earth or stone which it has cut out, and these show to a certain extent what strata are being passed through. The worm is used for rocks too hard to be entered by the auger; it is in form like a large spiral gimlet. As it cannot bring up materials with it to the surface, an auger is used after it to enlarge and clear out the hole it has made. The process of **B.** with both kinds of tools is carried on by fixing a long crosshead to them above the level of the ground, and causing it to be turned round by men. As the hole deepens, a lengthening bar 10

feet long is attached to the tool, then another similar bar is attached to the first, and so on until the desired depth is reached. The *jumper* is used for rock too hard to be drilled. It is simply a steel chisel, which, being continually raised and allowed to fall again, breaks the rock underneath it into fragments. The chips thus made are cleared out afterwards with an auger, or in some cases jumpers are used of such a form that they can themselves clear out the hole. The varieties of **B.** tools are almost innumerable, but most of them come in one or other of the three classes described. Special tools, with valves opening upwards at their lower ends, are used for soft or wet strata, in which also it is often necessary to line the bore with tubing. For very hard rock, diamond-pointed tools are now being used with great success, and in many cases they are worked by compressed air where hand-working would be impossible. Tools are also made which will bring up solid cylinders of the material bored through, instead of breaking it into fragments. See also MINING and TUNNELLING.

Borlase, Rev. William, an English antiquary, was born at Pendennis, Cornwall, February 2, 1696, educated at Exeter College, Oxford, and appointed vicar of St Just, 1732. He died at Ludgvan, 31st August 1772. **B.** is the author of *Antiquities of Cornwall* (1754), and *Natural History of Cornwall* (1758). **B.** was one of Pope's correspondents, and is the author of several religious pieces, now forgotten.—Another Cornishman of this name, **Henry B.** (died 1835), was the founder of the 'Plymouth Brethren' (q. v.).

Borneo. See CAMPHOR, OIL OF.

Borneo, next to New Guinea the largest island in the world, and by far the largest in the Indian Archipelago, lies about 250 miles W. of the Malay peninsula, in lat. 7° N.—4° 20' S. and long. 106° 40'—116° 46' E. It is irregular in shape, some 800 miles long and 700 broad, and is bounded N. and W. by the Gulf of Siam and Chinese Sea, S. by the Sea of Java, and E. by the Sea of Celebes. Area, 279,400 sq. miles; pop. estimated at 3,000,000. It is traversed from S.W. to N.E. by two almost parallel mountain ranges, the space between which is flat, well watered, and fertile. There are many large rivers, chiefly in the N. and W., but they have usually bars at their entrance; and as the coasts do not present large indentations, there are few good harbours. The climate is temperate in the N., where the country is hilly, but in the lower parts is humid and unhealthy, the rainy season lasting from November to May. There are said to be many large lakes in the interior, but the island is unexplored in many parts. The botanical products are singularly various, including iron-wood, ebony, sandal-wood, gutta-percha, teak, ratans, benzoin, dragon's-blood, sago, and various vegetable oils, gums, and dye-woods. The exports also include spices, pepper, rice, yams, cotton, sugar-cane, indigo, fruits, cocoa-nuts, coffee, and tobacco, as well as gold, coal, diamonds, pearls, camphor (the finest in Asia), petroleum, iron, tin, and sulphur. The principal wild animals are the tiger, bear, ourang-outang, tapir, boar, and in the N. the elephant and rhinoceros. Among the birds are eagles, vultures, peacocks, Argus-pheasants, flamingoes, parrots, and many other species remarkable for their brilliant plumage. The population is mainly composed of—(1) Malays, formed into many independent states in the N., chief of which is Brunai or B. (pop. 225,000); (2) Dyaks, the aborigines (a negro race), chiefly engaged in agriculture; and (3) Chinese settlers, of whom there are some 75,000. The principal towns are Banjarmasin, Brunai, Sarawak, and Sambas. **B.** was discovered by the Portuguese as early as 1523, but the Dutch first permanently effected a settlement in 1643. In 1702, and again in 1774, the English were unsuccessful in attempting to establish a factory here. The Dutch now nominally possess the greater part of the island, their two residences being Pontianak in the S. and Banjarmasin in the E.; while the Sultan of B. Proper rules a comparatively small territory in the N.W., including Sarawak (28,000 sq. miles), of which Sir James Brooke (q. v.) was for several years rajah. Labuan (q. v.), a small island about three miles off the N.W. coast, was acquired by Britain in 1840. See Brooke, *Narrative of Events in B. and Celebes down to the Occupation of Labuan* (2 vols. Lond. 1848); Veth, *B.'s Wester-aflading* (2 vols. Zalt-Bommel, 1854-56); Spenser, *Life in the Forests of the Far East* (2 vols. Lond. 1862); *A Few Months in B.* (Society for the Promotion of Christian Knowledge, Lond. 1874); and Wallace, *The Malay Peninsula* (5th ed. Lond. 1875).



Wartop Rock-Drill for Boring Rocks, (Selig, London).

feet long is attached to the tool, then another similar bar is attached to the first, and so on until the desired depth is

Bornholm, a pleasant village in the vicinity of Frankfort-on-the-Main, of which, indeed, it is almost a suburb. It is a favourite summer resort of the Frankforters. Pop. (1872) 6397. On the *B. Heath* the members of parliament Prince Lichnowsky and Von Auerswald were murdered, 18th September 1848.

Bornholm, the most easterly of the Danish islands in the entrance to the Baltic, 95 miles E. of Zealand, and nearly midway between the coasts of Sweden and Germany. It is traversed from N. to S. by a range of high hills, which yields the clay used for the porcelain manufactures of Copenhagen. Rönne (q. v.) is the chief town. Area, 231 sq. miles; pop. 29,300, chiefly engaged in husbandry and fishing.

Bornu, a native state of the Sudan, Central Africa, to the W. of Lake Tchad, with an area of 52,800 sq. miles, and, it is estimated, 2,000,000 inhabitants. It was founded as a kingdom by Ali-Dunamani as early as 1472, and under Edriss Alamoia (1571-1603) reached its greatest power. The form of government is now despotic, and was vested in the Sultan Omar on the visit of Barth in 1835. The population is chiefly composed of the aboriginal Kanori, for the most part engaged in husbandry, and their conquerors the Shuas, a semi-nomadic Arab race. B. produces heavy crops of maize, rice, cotton, and indigo, and possesses abundance of oxen, sheep, and horses, while it abounds in wild animals. There are native manufactures of armour and cotton cloth. During the rainy season, October to April, fever prevails. The present capital is Kuka, on the W. shore of Lake Tchad. Dr Nachtigal visited B. in 1872.

Boro-Budor, a magnificent temple in the interior of Java, residency of Kadu, dedicated, as the name implies, to 'the Great Buddha.' It is the finest specimen of Buddhist architecture in existence, and is loaded with ornamentation, there still remaining not fewer than 400 life-sized figures of Buddha, ranged in niches, besides innumerable smaller statues of the god, bas-reliefs, and rich carvings. The temple is in the form of a quadrangular pyramid, 124 feet high by 561 feet broad at base, and rises in a succession of eight immense terraces, led up to by flights of steps; the highest terrace being surmounted by a pagoda or dome, covering a chamber supposed to have been the depository of sacred relics. B.-B. is supposed to belong to the 10th c. See Crawford, *On the Ruins of B. in Java*, in the *Transactions of the Lit. Soc. of Bombay* (2 vols. Lond. 1823); Mielsing, *Prachtbauten van Java'sche Oudheden* (Haag, 1852); and Ferguson, *Handbook of Architecture*.

Borodino, a village in the government of Moscow, Russia, on the Kolozza, 55 miles W. of Moscow by railway, memorable for the bloody battle fought there, 7th September 1812, between the French under Napoleon I. and the Russians under Kutosow. The Russians, though forced to retreat, regarded this battle as a victory, and in 1839 a memorial column was erected on the site of the conflict.

Boron is one of the non-metallic elements, and is contained in borax, boracic acid, and a few comparatively rare and unimportant minerals. It was discovered in 1808 by Gay-Lussac and Thenard. Like carbon and silicon, it exists in two distinct conditions—the amorphous and crystalline; hence it is *allotropic*. (See ALLOTROPY.) *Amorphous B.* is obtained by heating boracic acid with sodium, and is a brown opaque powder, soluble in solutions of the alkalis, and can be burnt if heated. *Crystalline B.*, obtained by strongly heating amorphous B. with aluminum, resembles the diamond in hardness, transparency, and brilliancy, and is incombustible, even if heated in the oxy-hydrogen blow-pipe, neither is it attacked by solutions of the alkalis. Amorphous B. possesses the remarkable property of combining directly with nitrogen. The chemical symbol for B. is B, and its atomic weight 11. It forms a liquid chloride, BCL; a gaseous fluoride, BF₃; an oxide, B₂O₃ (boracic anhydride), and a sulphide, B₂S₃.

Borough (in Old Eng. *burh*, from 'beorgan,' to protect; hence a fortified place). As a suffix, the word appears in three forms—'bury' in the S. of England, as Canterbury; 'borough' in the midland and northern parts, as Peterborough and Middleborough; and 'burgh' in Scotland, as Roxburgh, Jedburgh. These forms represent dialectic differences; the first being, on the whole, confined to the parts which the West Saxons possessed;

the second and third are Anglian (Mercian and Northumbrian). As it was a Midland dialect from which modern English has sprung, the form which marks the independent use of the word is naturally 'B.' B., in England, is defined under the Municipal Reform Act to mean a city, B., port, or town corporate, whether represented in Parliament or not. By a Parliamentary B. is meant a B. sending a member, or more than one, to Parliament. Under the Reform Act of 1832, 56 boroughs in England and Wales were wholly disfranchised; 30 which had formerly returned two members were restricted to one; while 42 new boroughs were created, 22 having two new members, and 20 having one member. By the Reform Act of 1868, every B. having less than 10,000 inhabitants and two representatives was deprived of one of them, and seven boroughs were entirely disfranchised. Two English boroughs, and two in Ireland, have since been disfranchised for bribery. By the Reform Act of 1832, the B. franchise was given to all occupiers of houses of the value of £10 a year. The Act of 1868 extended the franchise to all occupiers of dwelling-houses who on the 31st July of each year have resided in them for twelve months, and have been rated to the poor rates, and have paid their rates up to the preceding 5th January; and to lodgers who, for the same period, have occupied lodgings of the annual unfurnished value of £12.

B. English is, in England, a law or custom under which the youngest son inherits real estate in preference to his elder brothers. It still prevails in Stafford, and in some other ancient boroughs. Should the youngest son die in his father's lifetime, leaving a daughter, she inherits her father's rights.

B. Fund.—The Municipal Corporation Acts defines the application of this term, and provides for the collection and disbursement of the funds of boroughs noted in the schedules annexed to the Act. Under it corporations may now, with certain restrictions, conduct parliamentary and law business at the expense of the B. F.

B. Justices.—Under the Municipal Corporations Act, these consist of the mayor during his tenure of office, and for one year afterwards, the recorder *ex officio*, and of justices appointed by the crown.

B. Laws are a collection of laws relative to Scotch boroughs, enacted in the reign of David I., in the 12th c. They are interesting only to the archaeologist.

B. Rate is a rate leviable within a B. when the B. Fund (q. v.) is deficient. It is of the nature of a County Rate (q. v.). It is regulated by the Municipal Corporations Act. For boroughs not within this Act, the B. R. is levied and applied under the Statute 17th and 18th Vict., c. 71. The rate cannot be made retrospective.

Boroughbridge, a market-town in the W. Riding, Yorkshire, on the right bank of the navigable river Ure, 17 miles N.W. of York, and 6½ S.E. of Ripon, with some trade in corn and hardware. It was the scene of the defeat of the barons under the Earl of Lancaster by Edward II. in 1321. Near it stand three singular stones ('Devil's Arrows') 16 to 24 feet high. B. is the terminus of a branch of the N. Eastern Railway. Pop. (1871) 2508.

Borovitchi, a town in the government of Novgorod, Russia, 140 miles S.E. of St Petersburg, situated on the Msta, and on the canal connecting the Volga with that river, and so with Lake Ladoga. Pop. 9150.

Borovsk, a town in the government of Kalouga, Russia, 57 miles S.W. of Moscow, and 25 N. of the city of Kalouga, together with which it gives title to a bishop. Near it is one of the wealthiest of Russian convents, founded in 1444. B. has an active trade in leather, flax, hemp, and sailcloth, and is famed for its onions and garlic. Pop. 8826.

Borromeo's Islands, a beautiful group of islets, called also the *Enchanted Islands*, situated in Lago Maggiore, N. Italy, province of Novara, and which have been the residence of the Borromeo family since the 13th c. The most remarkable of the group are *Isola Bella*, containing the Borromeo Palace; *Isola Madre*, crowned by an old castle; *Isola di Pescatori*, inhabited by some 400 fishermen and smugglers; and *Isola di San Giovanni*, laid out in beautiful gardens and terraces.

Borromeo, Carlo, son of Gilbert, Count of Arona, and Margaret de Medici, was born 2d October 1538, at the Castle of

Arona on Lago Maggiore. After studying at the University of Pavia (in which city he afterwards founded the Borromean College), he was appointed by his uncle, Giovanni Angelo de Medici (Pius IV.), a Cardinal Deacon, Archbishop of Milan, and Legate of Bologna. While discharging the duties of these posts with great energy, he found time to form at Rome an academy for literature and elocution, the meetings of which were called *Avetes Vaticane*. During the later sittings of the Council of Trent (1562-64), B. was, with Guise and Morone, among the most active of the cardinals, and afterwards one of the authors of the 'Catechism of Trent.' After six years' residence at Rome, B., in obedience to the Tridentine Decree requiring residence of bishops, went to Milan. The whole diocese, with its 3200 clergy, was in a corrupt state, the sacraments of confession and confirmation being little used. B., who was now celebrated for his saintly austerities, at once held a council for enforcing the new decrees relating to faith and discipline. On his uncle's death, the saint spoke in the conclave in support of Cardinal Alexandrine, who became Pius V. (1566). B. now gave away in charity most of his large possessions, enforced the rule against pluralities in his diocese, and himself set an example of diligent work and fasting to his clergy. He also gave the Duomo of Milan its present choir and altar, and encouraged associations of lay catechists, such as the *Picciatori*. A searching general visitation of the whole diocese was made; and St John the Baptist's seminary for clerics was founded at Milan. In the famine of 1570 and the plague of 1576 the saint behaved nobly. In 1578 he founded the Oblates of St Ambrose, a fraternity of secular priests for special missionary work. These reforms brought B. frequently into collision with the regular orders (e.g., the Umiliati, who tried to murder him) and the Spanish governors (Albuquerque and Requesius). B. also founded the Borromean League of the Seven Catholic Twin Cantons. He died 3d November 1584, worn out by excessive self-mortifications, and was canonised in 1616. A colossal statue of the saint stands near Arona on the Lago Maggiore. His works were edited by Sax in 1747 in 5 vols. His Life has been written by Giussano (Fr. transl. 1615), Godeau (Bruss. 1684; Par. 1747), Tournon (Par. 1761), and Stolz (Zür. 1781). See also Sala's *Documenti Circa la Vita e la Gesta di B.* (4 vols. Mil. 1857-59). There is an English biography in the Catholic Popular Library (1858).

Borrow, George, an English author, was born in Norfolk in 1803. While a lad he lived much among gipsies near Norwich, and acquired a minute acquaintance with their habits and language. He was originally intended to be a solicitor, but abandoned the profession for literary work in London. In 1833 he became an agent for the British and Foreign Bible Society, and in this capacity visited many countries, including Russia and Spain, in the latter incurring considerable personal risk, and being twice imprisoned for endeavouring to circulate the Bible. During his stay there, he mixed with the Zingali or gipsies, and in 1841, after he had retired from the service of the Society, he published an account of them which attracted very considerable attention, and in which he endeavoured to show that their language was intimately connected with the Sanskrit. This was followed in 1842 by his still more celebrated *Bible in Spain*. B. pursued his researches into the habits of gipsies in 1844, especially in Hungary, Wallachia, and Turkey. In 1851 appeared his *Lavengro*, which is partly an autobiography; in 1857 the *Romany Rye*; in 1862 *Wild Wales*; in 1874 *Romano Lavo-til*. B. has contributed to periodical literature both in prose and in verse, and has translated portions of the Scriptures into various languages, including the Zingali and the Manchu or Chinese-Tartar.

Borrowing. Some difficulty has been found in giving a legal definition to this term. A great legal authority has defined it as the reception of something *lent*, on the view that that which an owner puts into the hands of another, for the benefit or convenience of the owner alone, is not *lent*, but deposited. Where there is a lender, therefore, there must be a borrower. It does not, however, seem to us correct to say that B. is necessarily gratuitous, or even *principally* for the use or advantage of him who borrows. C *borrow*s a sum of money from D at 5 per cent. Here D presumably has as much advantage from the loan as C has. Where an article is deposited with any one, or intrusted to him solely for the convenience of the depositor, no liability for loss or damage is morally or legally incurred by the person so trusted, even though that loss or damage come through his negli-

gence. Thus, if A ask B to buy him a watch in Paris and bring it to London gratuitously, and B buys it and loses it on the way to London, A must pay to B the full price of the watch. B cannot be supposed gratuitously to run the risk even of his own carelessness. If, however, B asks A to lend him gratuitously anything, say a horse, he is then liable not only for the consequences of his own carelessness, but for the consequences of accident while in his custody. Regarding Hire (q. v.) the law is different. Were A to ask B as a favour to ride his horse for him, this would entirely exonerate B from the consequences of accident; but were B in this case to lend A's horse to D, without A's knowledge or consent, B would incur liability to A; because loan merely infers right of personal use, not even a temporary right of property.

Borrowstownness', or Bo'ness', a town in Lialithgow-shire, on the S. coast of the Firth of Forth, 17 miles W.N.W. of Edinburgh, and 3 N. of Linlithgow, with some manufactures of salt, vitriol, soap, malt, and earthenware. It is a station on the Monkland Railway, has extensive coal-mines, and lies in a district rich in iron, limestone, and freestone. In the 17th c. it ranked next to Leith among Scottish ports, but its trade is now chiefly coasting. B. registered, in 1874, 27 vessels of 3349 tons; in 1873, 647 vessels of 68,897 tons entered the port, and 1527 of 169,815 tons cleared. A portion of the Roman wall of Antoninus, known as Graham's Dyke, is still seen here. Pop. (1871) 4256.

Borsad, a town in the executive district of Kaira, province of Bombay, N. Division, about midway between Baroda and Ahmedabad, and distant from each about 40 miles. It lies in the elevated region of Gujerat, which is upwards of 1900 feet above the sea-level, and which is traversed by the Bombay and Baroda Railway. Pop. (1872) 12,214.

Bort, or Boart, dark-grey or black lustreless diamonds found in the Brazilian mines. They are also called *carbonado* or anthracitic diamonds, and possessing the hardness of the precious mineral, they are used for diamond rock-boring drills, for machines used to dress millstones, and other stone-cutting apparatus.

Borwad, a town in the district of Kandesh, province of Bombay, Br. India, about 100 miles N.E. of Bombay city, with a pop. (1872) of 5197.

Bory de Saint-Vincent, Jean Baptiste George Marie, a celebrated French naturalist and author, was born at Agen (Lot-et-Garonne), in 1780. In 1800 he accompanied Captain Baudin on a scientific expedition to New Holland, and after his return home served at Austerlitz and Ulm, and was one of Soult's staff in the Peninsula. He served as a colonel at Waterloo, after which, on the ascension of the Bourbons, he was forced into exile. Returning to Paris in 1820, he applied himself chiefly to literary and scientific work; superintended the scientific expedition to the Morea and the Cyclades, the account of which he gave in his *Expedition Scientifique de Morée* (Par. 1832). B. died December 22, 1846. His chief works are his *Annales des Sciences Physiques* (8 vols., edited at Brussels during his exile), his *Traité de L'Homme* (1827), and accounts of his various travels, scientific and otherwise, which he undertook.

Bor'zna, or Borana, the capital of a circle of the same name, government of Tchernigov, Russia, 25 miles N.E. of Ujeschia, is a station on the Moscow Railway. Pop. 7231.

Bos. See BOVIDÆ and Ox.

Bos, Lambert, a Dutch philologist, was born at Workum, Friesland, 23d November 1670. He studied Greek at the University of Franeker, was chosen reader in Greek there 1697, and professor 1704. He died 6th January 1717. B.'s works are now seldom consulted. His *Ellipser Græca* (Franeker, 1702) was reprinted at Glasgow in 1813, with dissertations by Weiske and Hermann. Other works of B. are the *Vetus Testamentum* (Franeker, 1709) and *Antiquitatum Græcarum Descriptio brevis* (Franeker, 1714; Leips. 1749).

Bo'sa, a finely situated but unhealthy town in the province of Cagliari, Sardinia, a few miles from the W. coast, on a river of the same name (Lat. *Temus*), possesses an old castle, a cath-

dral, and several monasteries. It has a trade in wine, oil, grain, and cheese. Pop. 6403.

Boscan-Almoga'ver, Juan, a Spanish poet, of patrician descent, born at Barcelona about 1500. After spending some time at the court of Charles V., he retired to Barcelona, where he died in 1544. B. revolutionised Spanish poetry by clothing it in Italian forms. His hendecasyllabic version of *Hero and Leander* is much admired for its elegance and purity. B.'s works, with those of Garcilasso de la Vega (*Las Obras de B. y Algunas de Garcilasso de la Vega*), were published at Lisbon in 1543, and at Leon in 1549.

Boscawen, Edward, a distinguished British commander, second son of Hugh B., first Viscount Falmouth, was born August 19, 1711, in Cornwall. He entered the navy, early distinguished himself at Puerto-Bello and Carthage, and, under Anson, took part in the battle of Finisterre, 1747. He was made rear-admiral, and sent with a squadron to the E. Indies, when, although he failed in an attempt upon Pondicherry, he succeeded in taking Madras. B. crowned a series of daring exploits in the war with the French by gaining a great victory over the Toulon fleet in the Bay of Lagos in 1759. For his services he received the thanks of Parliament, the rank of general of marines, and a pension of £3000 a year. He died 10th January 1761.

Bosch, Hieronymus de, born at Amsterdam, 23d March 1740. His favourite study was Latin poetry, and his own compositions in Latin verse have not been equalled since. In 1800 he was appointed curator of the University of Leyden, where he died, 1st June 1811. B.'s best works are his *Poemata* (Leyd. 1803; 2d ed. Utrecht. 1808) and his *Anthologia Græca* (4 vols. Utrecht. 1795-1810; Lennep, 1822), accompanied by a metrical version of Grotius not previously printed.

Bos'cobel, an extra-parochial district in the Shiffnal division of the hundred of Brimstree in Shropshire. In B. House, which was then occupied by Thomas Penderell, a farmer, and his four brothers, Charles II. took refuge after his defeat at Worcester in 1651. The brothers disguised the King in their clothes, and faithfully concealed him for several days, partly in the house and partly in the wood. On one occasion, from a thick oak in which he lay, he saw his unconscious pursuers passing his hiding-place. A tree, called the 'Royal Oak,' said to have sprung from an acorn of the old tree, still stands in the wood. The *B. Tracts* contain an interesting narrative of the above incident in Charles's life, written at the time, though first published in 1662. They are generally attributed to Thomas Blount, a Worcestershire gentleman, though this has been denied by his grandson, Nash, on Blount's own authority.

Bos'co Reale, a town in the province of Naples, South Italy, at the S. base of Mount Vesuvius, from one of the eruptions of which, in 1850, the town was in great danger of destruction, a large lava stream flowing down on both sides of it and desolating the neighbouring country. It has some trade in wine and silk, which are largely produced in the vicinity. Pop. 4553.—**B. Tre-Osa'se**, an Italian town in the province of Naples, situated close by Bosco Reale, has a royal manufactory of gunpowder and arms. Pop. 9163.

Bos'covich, Roger Joseph, an eminent mathematician and physicist, was born at Ragusa, May 18, 1711, became a member of the Society of Jesus at an early age, and occupied in succession the chairs of Astronomy at Rome, Pavia, and Milan, at which place he died, 12th February 1787. He was a strenuous supporter of the Gravitation Theory, and boldly extended Newton's conceptions to the ultimate state of matter.

Bo'sio, François-Joseph, Baron, a French sculptor, was born at Monaco, 19th March 1769, and studied at Paris under Pajou. By order of Napoleon I. he executed the bas-reliefs for the column of the Place Vendôme, became a member of the Academy of Fine Arts in Paris, received from Charles X. the title of Baron, and died at Paris, July 29, 1845. B. executed numerous busts, among others, of Napoleon I., Josephine, Louis XVIII., Charles X., &c. Among his best-known works are his bronze 'Hercules,' in the garden of the Tuileries; the 'Young Hyacinth,' in the Louvre; a marble group of 'History

and the Arts consecrating the Glories of France,' &c. B.'s works are models of grace, proportion, and elaborate finish.

Bosjes'mans (i.e., *Bushman*), a name given by the Dutch to a degraded branch of the Hottentot race, inhabiting the country N. of Cape Colony, and which is rapidly dying out.

Bos'na-Serai', or Serajevo (i.e., 'palace of Bosnia'; Ital. *seraglio*), chief town of the former vilayet of Bosnia, on the river Bosna, 92 miles N. by E. of Ragusa, and 116 miles S.W. of Belgrade. It is surrounded by mountains, and though now stripped of its former defences, is still a place of strength. It is the seat of the governor-general of the province, and contains 100 mosques, a number of Greek, and several Catholic churches. Its chief manufactures are arms, copper, iron, lead, and gold wares, and woollen, leather, and cotton goods. Pop. 50,200, mainly Turks. B. was founded in 1263. A terrible fire in August 1879 rendered 20,000 people homeless, and inflicted a loss of 100,000,000 florins.

Bos'nia (*Bosna*), formerly a vilayet in the N.W. of European Turkey, consisting of B. Proper, Turkish Croatia, Turkish Dalmatia, and the Herzegovina, now placed under the military administration of Austria, is bounded N. by the Save and Unna, E. by the Juhlanik mountain range, S. by the Scardagh mountains, and W. by the mountains of Cosman, Timor, and Steriza. Area, 23,320 sq. miles; pop. (1873) 1,279,298. The S. part consists of vast tablelands, intersected by spurs of the Dinaric Alps, ranging from 6000 to 7000 feet in height, and presenting snow-covered peaks from September to June; while in the N. the country gradually declines to the plain of the Save and Unna, and is watered by the Bosna, Ocrina, Drina, and the Verbas. The climate of B. is delightful, the air being mild and clear. There is much cattle, corn, fruit, wood, and wine, and also, although almost unwrought, abundance of metallic treasure, including gold, silver, lead, coal, and quicksilver. Iron is the only metal mined extensively. At Novibazar, Banja, Budimir, &c., there are many mineral springs. The transit trade, which is mostly in the hands of Jews, Greeks, Armenians, Italians, and Germans, is much hindered by the want of good roads. The population, chiefly of Slavonic origin, is composed of Bosnians, Servians, Morlacks, Croats, Turks, Greeks, Jews, Gipsies, Wallachians, &c. In 1868 some 431,200 belonged to the Greek, and 171,764 to the Roman Catholic Church, while there were in all 418,315 Mohammedans. B. has extensive manufactures of weapons, especially sword-blades, woollens, cutlery, and morocco leather. A projected railway through B. was in abeyance in 1875. The capital is Bosna-Serai (q. v.), and the next important towns are Banjaluka, Travnik, Mostar, and Fotesha.

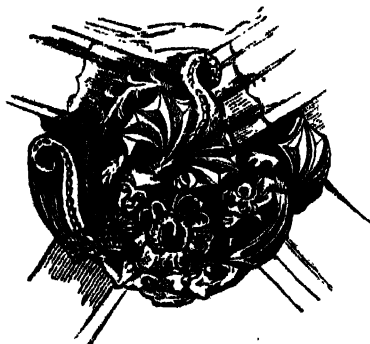
In the Roman time, B. formed part of Pannonia; was divided into four Christian dioceses under Justinian; formed separate states or *bans* in allegiance to the Servian and Croat kingdoms from 940; in the 12th and 13th centuries belonged to Hungary; was taken (1339) by the Servian king Stephen, and on his death remained for a short time independent. In 1398 it became tributary to the Ottoman empire, and was made a Turkish province in 1503. The tyrannous policy of the Porte led to frequent outbursts of rebellion, as in 1737 and 1851, but the power of the conqueror was long sufficient to maintain possession of the province. In 1875, however, the imposition of several special taxes, levied exclusively on the Christian rayahs, a grievance aggravated by the rapacity of the collectors, led to an insurrection in Herzegovina. Originating in a local grievance, it soon assumed the proportions of a national movement, spread to Montenegro, and had the sympathy of Servia. The promulgation at Constantinople of an imperial firman, dated 14th December 1875, decreeing great reforms in the public administration, came too late to satisfy the insurgents, who were bent on achieving independence. Desultory fighting continued to take place. The Turkish troops were generally successful, and crowds of Bosnian peasants sought refuge within Austrian territory, but the insurgents could not be subdued. In March 1876 their demands increased. The Bulgarian massacres in May, and the Servian declaration of war in June, made it still more difficult for the Porte to crush the rebellion, and finally the terrible struggle with Russia made it impossible. The solution arrived at by the Treaty of Berlin (July 1878) was to place B. and Herzegovina under the military administration of Austria, whose troops in August 1878 entered

the province, but encountered fierce opposition from the more fanatical section of the inhabitants, partly abetted by the Turkish soldiery. The Austrian authority, however, was finally established before the close of 1878. See Maurer, *Reise durch B., die Savelländer, und Ungarn* (Berl. 1870); and *Turkey and Russia: Their Races, History, and Wars* (T. C. Jack, Edinb. 1878).

Bosporus ('Ox-ford'), the Greek name of the strait that unites the Black Sea with the Sea of Marmora. To distinguish it from other straits similarly named, it was known as the *Thracian B.* It is about 17 miles long, 600 yards wide where narrowest, and 1640 yards opposite the gate of the Seraglio, Constantinople. It has a great depth of water. There are two lighthouses at each end. The statement of Pliny that the opposite shores are within the range of the human voice is not correct. The Strait of Kaffa, or Yenikalé, which unites the Sea of Azof with the Black Sea, was named by the ancients the *Cimmerian B.*

Bosquet, Pierre François Joseph, a distinguished French general, was born at Mont de Marsan, in the department of Landes, France, 8th November 1810. He was educated for the army, and in 1834 distinguished himself in Algeria. He further played an important part in the Crimean war, especially at the battles of Alma, 25th September 1854, and Inkerman, 25th November, receiving for his services to Lord Raglan at the latter engagement a vote of thanks from the British Parliament. At the capture of the Malakoff, 8th September 1855, he was wounded by the bursting of a shell, and had to return to France. Next year he was made a field-marshal. B. died 4th February 1861.

Boss, in mediæval architecture, a piece of stone usually carved in a fanciful manner, which covers the intersections of the ribs of ceilings. It is commonly finished with a flower or a human mask.



Boss in St Giles's Cathedral, Edinburgh

Boss, a term in descriptive botany synonymous with *Umbonate* (q. v.).

Bossi, Luigi, Count, a learned Italian archaeologist and historian, was born at Milan, February 28, 1785. He studied at Pavia, and was appointed by Napoleon, on the

annexation of Piedmont to France, prefect of the archives of the kingdom of Italy. He died at Milan, 10th April 1835. B.'s numerous writings (upwards of eighty in all) embrace many subjects—history, antiquities, natural science, philology, the fine arts, and the drama. Among the more notable are his *Introduzione allo Studio delle Arti del Disegno*, which is said to exhibit more learning than taste; his translation of Roscoe's *Leo X.* (12 vols. Mil. 1816-17) contains valuable additional matter; his *Storia della Spagna* (8 vols. Mil. 1821); and *Istoria d'Italia* (19 vols. Mil. 1819-1823).

Bossuet, Jacques Bénigne, a great French ecclesiastical orator, was born at Dijon, 27th September 1627. Taught by the Jesuits of Dijon, he entered the Church in 1652, and became successively Dean of the Cathedral of Metz, Bishop of Cordan (1669), and Bishop of Meaux (1681), which see he occupied at his death. The admiration felt by Anne of Austria and Louis XIV. for his preaching procured for him the post of preacher to the court (in which he was succeeded by Bourdaloue), and of preceptor to the Dauphin, for whose instruction he wrote (1679) his *Discours sur l'Histoire Universelle*, an attempt to trace a general providence working for the Catholic Church in the Biblical history, in the history of ancient ethnic religions, except those of India and China, and in Christian history to the time of Charlemagne. B. also became warden of the Sorbonne, and in 1697 a member of the Council of State. At Meaux he was a devoted

bishop. B. died at Paris, 16th April 1704. His *Oraisons Funèbres* upon contemporaries, such as De Condé, Gustavus, Cromwell, Mazarin, the Dukes of Orleans, are splendid specimens of lofty religious eloquence. B. was great in theological controversy as well as in preaching. In his *Réflexion du Catechisme du Paul Ferri* he combated the doctrines of the Huguenots. In *Maximes sur la Comédie* he vehemently opposed Father Caffaro, who had defended theatrical entertainments. His *Exposition de la Doctrine de l'Eglise Catholique sur les Matières de Controverse* (1671), after being for some time discountenanced at Rome, was formally adopted by the Gallican clergy at the great synod of 1682, where B., who discussed with Leibnitz the scheme of Molanus for the union of the Lutheran and Gallican Churches, supported the Régale of France, the customs of the Gallican Church, and the superior authority of general councils, against the Papal claim to temporal sovereignty, all vacant benefices, and spiritual independence of the Church. This book is said to have converted Marshal Turenne to the Catholic Church. The *Histoire des Variations* (1688) is intended, by a survey of the German, Swiss, French, and English Reformation, to demonstrate the superior unity and authority of the Roman Church, and the inevitable tendency of apostasy into Socinianism. Basnage's *History of the Reformed Churches* was intended as a reply. B. also took part in the controversies with Port-Royal, and signed the formulary against Jansenius. His quarrel with Fénelon about Quietism is the one undignified passage in his life. In his *Politique tirée de Sainte Ecriture* he seems, at least rhetorically, to uphold the divine right of kings. The accounts of the semi-public discussion between B. and the Huguenot Claude are of the deepest interest. B. exerted himself to mitigate the 'dragonnade' which took place on the revocation of the Edict of Nantes. In 1875 Colonel Ferrel discovered in the Convent of Nancy a number of letters and unpublished MSS. of B., which had previously belonged to the Basompierre family. The Benedictine edition of B.'s works extends to 46 vols (Versailles, 1815-19), and is accompanied by a Life of B. by Cardinal Bausset. Another biography is that of Réaume (1869-70). There is an English (Catholic) Life by Charles Butler (vol. iii. of *Works*). B.'s secretary, Leducx, has left *Mémoires et Journal*. See also *B.* and his *Contemporaries* (Lond. 1875).—**Jacques B.**, nephew of the preceding, was born in 1644, and died Bishop of Troyes, 12th July 1743.

Boss, Charles, a celebrated French mathematician and physicist, and author of numerous excellent scientific writings, was born at Tartaras, near Lyon, 11th August 1730, and died at Paris, 14th January 1814. His most important works are *Traité Élémentaire de Mécanique et de Dynamique* (1763), *Cours Complète des Mathématiques* (7 vols. 1795-1801), *L'Histoire Générale des Mathématiques* (2 vols. 1810), and the *Traité du Calcul Différentiel et Intégral*.

Bostan'ji (Turk. 'garden watch'), the military guard of the Sultan's seraglio, named from their original office of superintendents of the imperial garden. At one time they numbered 5000 in peace and 12,000 in war time, but are now reduced to about 600. *B. Bashi* is the title of their commander, who is an official of rank and influence.

Boston, a borough and seaport on the Witham, Lincolnshire, 30 miles S.E. of Lincoln by railway. Its earliest name was St Botolph's Town, and the parish church of St Botolph, built in 1309, is a large and striking structure. The town, anciently an important commercial centre, has of late, owing to the reclamation of a large tract of fen-land in the neighbourhood, and the deepening of the river, acquired a considerable shipping trade, chiefly in the export of corn, cattle, and sheep. In 1873, 529 vessels with cargoes (tonnage, 21,739), and 63 in ballast (tonnage, 2281), entered the harbour of B.; while there cleared 172 with cargoes (tonnage, 8470), and 440 in ballast (tonnage, 24,813). It has, besides, manufactures of iron, sailcloth, rope, leather, and several breweries. Pop. (1871) of parliamentary borough, 17,518. B. returns two members to Parliament.

Boston, the capital of the state of Massachusetts, U.S., and the chief city of New England, 237 miles N.E. of New York by railway. The inlet on which it lies is deep, capacious, well protected, and studded with numerous islands. The railway system is very extensive, connecting B. with all parts of New England, New York, Canada, and the great West. The opening

of the Hoosac Tunnel recently in the western part of the state has greatly increased the facilities of B. in the western trade. The city stands upon a peninsula connected with the mainland by B. Neck, and is divided into B. Proper, South B., and East B., the last of which occupies an island nearly 2 miles long, and is about 600 yards from B. Proper. The river Charles, which here enters Massachusetts Bay, is crossed by several long bridges connecting B. with its suburbs. Recently the *Back Bay* has been filled up, splendid streets now standing where formerly were waste waters, and it is proposed to deal in like manner with the extensive shoal waters known as 'South B. Flats,' filling in the tract with material obtained by dredging the harbour to a depth of at least 23 feet. The harbour, which is marked by four lighthouses, is one of the best on the E. coast of America. B. is called the 'Trimontane' city, because of three eminences on the peninsula, the chief of which is Beacon Hill, on which stands the State House. There are many other important buildings, such as the R. C. church of the Redemptionists (1875-78), towering on a hill over all B., the City Hall, Custom-House, Athenaeum, Music-Hall, Faneuil Hall, and a Free Library of 275,000 vols. Near the centre of the city is the famous B. Common, a public park of 50 acres. The chief manufactures are machinery, chemicals, boots and shoes, iron and brass castings; there is also shipbuilding, sugar-refining, leather-dressing, &c.

B. has a large trade with India, China, and Russia, and the various states of the Union. It receives from the other states grain, tobacco, coal, cotton, and rice, and returns are made in the products of her manufactures. B. is also a great emporium for leather, wool, petroleum, spirits, fish, and ice. At 30th June 1874, B. (along with Charlestown) registered 985 vessels of 312,381 tons. For the year ending 30th June 1874, the shipping statistics gave 599 American vessels with 228,155 tons, and 2118 foreign vessels with 502,614 tons entering the port. The clearances were 588 American vessels of 211,729 tons, and 2064 foreign vessels of 447,373 tons. The imports in the same year were \$51,166,740, and exports \$27,976,591, the export of iron and steel being \$1,216,934. B. has a large number of old families of great wealth, and the capital and financial worth of 'the solid men of B.' are proverbial. Pop. (1871) 250,526.

B. was founded in 1630, and has throughout been the historical centre of the old colonies. It has long maintained a high place in education, intellectual life, and public spirit, and it may well be regarded as the seat of literary culture in the United States, if not as the 'hub of the universe.' The Indian name of B. was Shawmut, supposed to mean 'living springs of water.' It was called B. in honour of the Rev. John Cotton, first minister of the place, formerly vicar of St. Botolph's, in Boston, England.

A great fire took place in B. in November 1872, destroying 776 buildings and \$60,000,000 of personal property. Roxbury was annexed to B. in 1868, Dorchester in 1870, Charlestown, Brighton, and West Roxbury in 1874. Bunker's Hill (q. v.) is now included within the bounds of the city.

Boston, Thomas, a once notable Scotch divine, was born at Dunse, March 7, 1676. He entered the University of Edinburgh in 1691, was licensed as a preacher in 1697, and was ordained at Simprin, September 21, 1699, where he remained till 1707, when he was removed to Ettrick. While visiting in his parish, he found a copy of the *Marrow of Modern Divinity*, by Edward Fisher, an English Puritan of the 17th c., and brought it to the notice of some ministers, one of whom republished it in 1718. B. and others were prosecuted in the Assembly on account of upholding the doctrines of the *Marrow*, and the dispute ultimately ended in the secession of the Erskines. Although B. did not leave the national Church, he may be called the *fons et origo* of all her subsequent agitations. His death took place May 20, 1732. B. was a fair scholar, a man of vigorous and pungent mind, well versed in Scripture, and not without literary faculty. His most famous book, once very precious in the eyes of Scottish piety, is the *Fourfold State* (1720), but a finer, though simpler production, is the *Crook in the Lot*.

Boswell, James, the 'first of biographers,' was the son of Lord Auchinleck, one of the judges of the Court of Session, and was born October 29, 1740, at Edinburgh. Originally intended for the bar, he studied at the Universities of Glasgow and Utrecht, and in 1766 he was admitted a member of the Faculty of Advocates. In 1763 he made the acquaintance of

Samuel Johnson in London. He at once fell down and worshipped him. After a tour on the Continent, in the course of which he became an ardent advocate of Corsican independence and an admirer of General Paoli, whose memoirs he wrote, he returned to Scotland, became, in 1773, a member of the Literary Club founded by Johnson, whose acts and sayings he now began to record with a fidelity and fulness to which there is no parallel. After various amours, of which a full account appears in a posthumous volume of *Letters of James B. addressed to the Rev. W. F. Temple* (1856), he married in 1769 a Scotch lady named Montgomery. For many years previous to Johnson's death in 1784, he had been his constant companion, and in 1785 he published a journal of that *Tour to the Hebrides* in which he was Johnson's associate, and in 1791 his *Life of Johnson*. The latter is acknowledged to be the best and fullest biography ever written, and no character in literature has been so carefully portrayed as that of Johnson. B. died in London, June 19, 1795. He was a vain and self-indulgent, but amiable and open-hearted man, and in his writings he makes no attempt to conceal his weaknesses. See *Boswelliana*, the *Commonplace Book of James B.*, edited, with a memoir, by Dr Rogers (Lond. 1874). His eldest son, **Sir Alexander B., Bart.**, born in 1775, was a man of considerable ability and humour, which were shown in his *Songs, chiefly in the Scottish Dialect*, published in 1803. He was killed at Auchtertool, in Fifeshire, in a duel with Mr Stuart of Dunearn, arising out of a keen parliamentary contest, March 26, 1822. B.'s younger son, **James B.** (born 1779, died 1822), annotated the *Life of Johnson*, and produced a scholarly edition of Malone's Shakespeare in 21 vols. 8vo, 1821.

Boswellia, a genus of plants of the natural order *Amyridaceae*, from which the gum resin known as *olibanum*, the *frankincense* of the Bible, is derived. It is now chiefly obtained from three species of B. (*B. Carterii*, *B. Bhau-Dajiana*, and *B. Frereana*), natives of Arabia and the Somali country in E. Africa. *B. papyrifera* of Abyssinia also yields a fragrant gum resin. See Cooke's *Report on the Gums, Resins, &c., of the India Museum* (1875).

Bosworth, or **Market Bosworth**, a town of Leicestershire, on a rising ground, 11 miles W. of Leicester, and overlooking the moor where was fought the celebrated battle which ended the struggle between the houses of York and Lancaster, and in which Richard III. was slain, August 21, 1485. The chief industry of B. is the knitting of worsted stockings. The town has a well-endowed free grammar-school, in which Dr Johnson was once usher. Pop. (1871) 13,746.

Bosworth, Joseph, D.D., well-known as a philologist and Teutonic scholar, was born in 1789. He was educated at Repton in Derbyshire, of which county he was a native, but graduated at Aberdeen. After holding several livings in England, he went to Holland as British chaplain, remaining there from 1831 to 1840. He was appointed rector of Water Stratford, near Buckingham, in 1858, and later became professor of Anglo-Saxon at Oxford. Dr B.'s studies in that language have given him celebrity. His *Elements of Anglo-Saxon Grammar* appeared in 1823, his *Dictionary of the Anglo-Saxon Language* in 1838, and his *Abstract of Scandinavian Literature* in 1848. Among his other works may be mentioned his edition of the Gospels in Gothic of 360 and in Anglo-Saxon of 995, with Wycliffe's and Tyndale's versions in parallel columns (Lond. 1865; 2d. ed. 1873). B. died at Oxford, 27th May 1876.

Bőszörmény, the chief of the six towns of the free district of Hadjuk, in the E. of Hungary, 12 miles N.N.W. of Debreczin, with an active trade in rye, tobacco, water-melons, soda, and saltpetre. Pop. (1869) 19,208.

Botanic Garden, a garden devoted to the cultivation and arrangement of plants of scientific, economic, or other interest to the student of botany. The ancients knew nothing of such gardens, and even when the mediæval universities or wealthy men of science formed them, they were almost exclusively limited in their design to the cultivation of medicinal plants, as their popular name of 'Physic Gardens' testifies. The chief botanic gardens on the Continent are the *Jardin des Plantes* at Paris, founded 1634, and now an important school of natural history, and those of Montpellier, Florence, Berlin, Schönbrunn, Copenhagen, &c. Nearly every considerable city and university town possesses a garden

of greater or less importance. In Great Britain, those of Kew, Edinburgh, and Dublin (Glasnevin), are the most important, though the Apothecaries' Company, the Royal Botanical Society, and the Royal Horticultural Society support at their own expense gardens of considerable extent in London. Kew receives a large subsidy from the Government, and under the successive direction of the two Hookers—father and son—has become an important scientific establishment, from which plants and seeds are sent to similar gardens in the country, the colonies, as well as to foreign gardens. There is a fine herbarium and library attached to the garden, which cause it to be much frequented by botanists from all countries, and no work on descriptive botany published of late years but owes much of its value to the assistance afforded by the Kew garden and herbarium. The Edinburgh garden is not of so much scientific importance, but on small funds is excellently kept. It was founded in 1680, and is now chiefly used as an adjunct to the botanical class of the university. The Glasnevin B. G., near Dublin, is of less note. In America there are many such gardens, such as that of New York, Cambridge, &c., though none of them rank high in scientific reputation, being more pleasure grounds than true botanic gardens. In India, there are several, that of Calcutta being of great magnificence and extent.

Botan'omancy (Gr. *botane*, a plant, and *manteia*, divination), an ancient species of divination by the use of plants. It assumed various forms, as writing one's name on leaves, and then exposing them to the winds; rubbing poppy flowers between the hands, &c.

Botan'ometry. See PHYLLOTAXIS.

Bot'any, or Phytology (Gr. *phyton*, plant, *logos*, discourse), the science which treats of the vegetable kingdom in all its phases. These different aspects may be classified as follows:—1. *General Anatomy or Histology* (Gr. *histos*, a web), the consideration of the microscopic structure of the tissues which make up the different organs, viz., Cells, Vessels, and Fibres (q. v.). 2. *Organography or Phytotomy*, which treats of that portion of the science occupied in describing the form, relations, and structure of the different organs of the plant, such as the root, stem, leaves, and flowers. 3. *Morphology* (Gr. *morphos*, form), or *Philosophical B.*, the study of the transformation of organs. For instance, in this section, the various transformations of the leaf into sepals, petals, stamens, and pistil are traced. It is to B. what comparative anatomy is to zoology. 4. *Organogenesis* is the study of the development of organs. 5. *Physiological B.* is the study of the functions of the different organs and the processes of plant life. 6. *Vegetable Chemistry* may be looked upon as a branch of physiological B. 7. *Vegetable Nosology* is the study of the diseases of plants. 8. *Treatology* is the study of the various accidental monstrosities of plants, and is very useful in enabling us to ascertain the true morphological significance of certain organs. 9. *Taxology* (Gr. *taxis*, arrangement), *Taxonomy* (Gr. *taxis*, arrangement, and *nomos*, law), *Classification*, or *Systematic B.*, is that department of the science by which the various forms of plants are classified according to certain principles, so that a knowledge of them may be more easily acquired, or their structure, affinities, or properties be better understood and retained by the memory. The early botanists knew so few plants that any elaborate system of classification was unnecessary and scarcely ever thought of. For instance, Hippocrates, the father of medical science (400 or 500 B.C.), mentions only 234, and Theophrastes (310-225 B.C.) vaguely describes about 500. Dioscorides, whose works were long standards in B., describes 600; and Pliny (A.D. 79), who was nearly his contemporary, 800—a number not more than was known to Conrad Gesner in the middle of the 16th c. Linnaeus described in his *Species Plantarum* (1753) 6200 types, and at his death, notwithstanding the progress which B. had made in the interval, he was not acquainted with more than 8551 species, of which 7728 were flowering plants. At the present day, though the flora of Thibet, China, Corea, Africa, and other parts of the world is imperfectly explored, botanists have described 100,000 flowering plants (Phanerogamia) and 25,000 Cryptogamia. Some system of classification became, therefore, more and more imperative as the number of species of plants known increased. The system of Ray gave way to that of Tournefort, founded on the form of the flower, which long maintained its ground, especially in France. This in its turn was superseded by the sys-

tem of Linnaeus, a Swedish botanist (born 1707), who entirely revolutionised B. He introduced the binomial system of nomenclature, that is to say, every plant was distinguished by two Latin names—the first expressing the Genus (q. v.), the second the species. All flowering plants he divided into 23 classes; the 24th was the *Cryptogamia*, or flowerless. The first 11 classes of flowering plants are named from the number of Stamens (q. v.)—viz., *Monandria* (Gr. *monos*, one, *aner*, a man), those with one stamen; *Diandria* (Gr. *dis*, twice), with two; *Triandria* (Gr. *treis*, three), with three, and so on; *Tetrandria* (Gr. *tetras*, four), *Pentandria* (Gr. *pente*, five), *Hexandria* (Gr. *hex*, six), *Heptandria* (Gr. *hepta*, seven), *Octandria* (Gr. *octo*, eight), *Enneandria* (Gr. *ennea*, nine), *Decandria* (Gr. *deka*, ten), and *Dodecandria* (Gr. *dodeka*, twelve), those having from 12 to 20 stamens. Class XII. is *Isocandria* (Gr. *isos*, twenty), and Class XIII. *Polyandria* (Gr. *polys*, many), which have numerous stamens inserted on the receptacle. Classes XIV., *Didynamia*, and XV., *Tetradynamia* (Gr. *dynamis*, power), are characterised by the stamens being of different lengths—the former having two long and two short stamens, the latter four long and two short. The other classes are *Monadelphia* (Gr. *monos*, one, *adelphos*, brother), in which the stamens are united by the filaments into one bundle; *Diadelphia*, in which one stamen is free, the others united; *Polyadelphia*, in which they are united in more than two bundles; *Syngenesia* (Gr. *syn*, together, and *gune*, a woman, or *genesis*, generation), the stamens in which are united by their anthers; *Gynandria*, in which the stamens are united with the pistil; *Monacia* (Gr. *oikos*, a house), in which the stamens and pistils are on different flowers on the same plant; *Diacia*, in which the male and female flowers are on different plants; and *Polygamia*, in which the stamens and pistils may be on the same or different flowers, on the same or on different plants. These classes are divided into orders, the first 13 of which are founded on the number of divisions of the pistil—*Monogynia*, *Digynia*, *Trigynia*, &c., up to *Dodecagynia*, including all with 12 to 19 pistils, and *Polygynia*, all with 20 and upwards. The orders of Class XIV. are two in number, *Gymnospermia* (Gr. *gymnos*, naked, *sperma*, seed), in which the seeds, as in pines and firs, lie behind a scale without any fruit-wall covering, and *Angiospermia* (Gr. *ang*, a vessel), in which the seeds are enclosed by a closed fruit or capsule, as in all other orders of plants. In Class XIV. the orders are also founded on the fruit; those of Classes XVI., XVII., XVIII., XX., XXI., and XXII., on the number of the stamens; Class XIX. upon characters taken from the florets of compound flowers; Class XXIII. upon characters taken from the circumstance of the hermaphrodite male and female flowers being found in one, two, or three plants. The orders of Class XXIV.—viz., *Felices* (or ferns), *Musci* (or mosses), *Algae* or *Fungi*, are natural. The classification of Linnaeus was, with a few exceptions, an artificial one, but it was so simple and beautiful, that it was soon universally received. The founder himself knew that it was founded upon arbitrary principles, and was only a forerunner of something better. In turn it was superseded by the natural classification of plants which holds sway in the botanical world at the present day. This system was originally promulgated by Jussieu, a French botanist, and has been improved by the De Candolles, Robert Brown, Lindley, Endlicher, Meisner, the Hookers, Bentham, and others, though the broad principles are the same as originally sketched out by its founder. It professes to arrange plants, as far as possible, by their likeness to each other in all points of structure; those which are most nearly allied to each other being placed in groups by themselves, all parts of the plant being taken as the basis of comparison, and not, as in the Linnaean classification, simply the stamens and pistils. In this way the vegetable kingdom is divided into *Phanerogamia* or flowering plants, *Cryptogamia* or flowerless plants, or into three great divisions:—1. *Dicotyledons*, plants with two seed lobes, net-veined leaves, and stems with concentric rings of annual growth (*Exogenous*, q. v.). 2. *Monocotyledons*, plants with a single seed lobe, parallel-veined leaves, and *Endogenous* (q. v.) stems, in which the woody bundles (when present) are scattered through the cellular substance of the stem, and the growth of which is from within outwards. 3. *Acotyledons*, comprising all the Cryptogamia, and in which the stem, if present, is of the *Acrogenous* (q. v.) or summit-growing type, as in the tree ferns. Under these divisions are arranged various orders or families, the number of which varies according to the views held

by different botanists. For instance, there are the *Ranunculaceæ*, or Buttercup order, the *Rosaceæ*, or Rose order, the *Leguminosæ*, or Bean and Pea order, the *Liliaceæ*, or Lily order, &c.; while the orders of Acotyledons are nearly the same as in the Linnæan classification. The natural classification has now entirely superseded the Linnæan. It is more difficult to learn; but the student, having once mastered it, is in possession of something more than the name of a plant merely, as in the Linnæan system, which was only an artificial key. He has obtained by the study of one plant a knowledge of the general structure of the whole order, and, as similar organs will have similar functions, of the properties of the plants also. 10. A division of Taxology is *Glossology* (Gr. *glossa*, a tongue), or *Terminology*, a study of the profuse vocabulary of botanical terms which botanists use in describing plants; the art of describing plants is styled *Phytography* (Gr. *grapho*, I write). The study of the ancient vegetation of the earth, the remains of which is now entombed in the rocks constituting its crust, is (11.) *Palæo-phytology* (Gr. *palaios*, ancient), or *Palæontological B.*; while the study of the way plants are distributed over the earth constitutes (12.) *Phyto-geography*, or *Geographical B.* 13. The study of the uses of plants from an economical point of view constitutes *Economical B.*, of which *Medical*, *Agricultural*, *Horticultural*, and *Industrial B.* are divisions. The history of B. may be briefly summed up. Up to the seventeenth c., science had scarcely a place in the study. It was merely studied from a medical or astrological point of view, and the then state of knowledge is embodied in the numerous quaint herbals, containing an immense mass of absurdities, which date from that period. Then came the era of the classifiers, of which Linnæus was the chief. He was indeed the Luther of B. The mania for classifying and describing species was continued in an unbroken line by the promulgators of the natural system. Within the last twenty years, physiological and anatomical B. has been attracting to it more students than systematic B., and the progress of this branch of science has been great on the Continent, while, owing to the numerous collections which are always being sent home from our many colonial possessions, and by English travellers in foreign countries, systematic B. is more cultivated here. The brilliant discoveries of Charles Darwin have inaugurated a new era, which may be styled the *philosophical* one. The students of his great and increasing school do not content themselves with alone studying the structure and relations of plants, but endeavour to pry into the secrets of their origin, plan, and design in the economy of nature, and whatever may be said of the Darwinian doctrines, there can be but one opinion as to the wonderful impetus which his researches have given to B., as well as to other departments of science. See Balfour's *Manual of B.*, Brown's *Manual of B.*, and Sachs' *Text-Book of B.* (for the views of the German school).

Botany Bay is situated 14 miles S. of Port Jackson Heads, its northern limit (Cape Banks) being in 34° S. lat. and 151° 16' E. long. It measures five miles from N. to S., and six miles from E. to W., is open to the E., and affords no shelter for vessels. Cook's and George's rivers empty themselves into it. B. B. was the first point in Australia touched at by Cook, 28th April 1770, and owes its name to the large number of new plants discovered there by Sir Joseph Banks (q. v.). The first settlement in Australia was founded here 26th January 1788, but was soon after removed to the infinitely superior site now occupied by the city of Sydney (q. v.). From being the name of the first, B. B. came to be applied to any Australian convict settlement.

Bot-Fly, or Gad-Fly, the term applied to certain genera of flies included in the family *Cestridae* of the *Dipterous* order. The term 'bot' was originally applied to the larva or caterpillar state of the fly, whilst the name 'gad-fly' was given to flies belonging to the family *Tabanidae*, of which the gad-fly (*Tabanus bovinus*) is a well-known member. The *Cestridae* possess a rudimentary proboscis; the antennæ are short, the terminal joint being provided with a bristle-like organ. Of this group, the horse-fly or horse-bot (*Gasterophilus* or *Cestrus equus*) is a typical example. This fly is found in Britain, though it is not so common in this country as on the continent of Europe. It averages half an inch in length. The body is woolly, and is coloured yellowish on the head, and reddish on the thorax and abdomen, with whitish wings. The female abdomen is prolonged to form a tubular organ. The

eggs being deposited in summer and autumn amid the hairs of a horse's coat, are licked off by the animal's tongue, and thus conveyed into the stomach. Within the horse's stomach the larvæ are developed, and provided with rings of bristly hooks, by which they retain their position on the walls of the organ. These larvæ remain within the body of their host all winter, and are discharged from the horse's alimentary canal during the following summer; and after passing their pupa state amid manure or in earth, emerge in a few weeks as the perfect winged insects. The pupa encloses itself simply within the dried larval skin. Another species is the *G.* or *Æ. hamorrhoidalis*, or red horse-bot, which resembles the previous form in habits. The ox-bot (*Cestrus bovis*) is the most famous member of this group, this species depositing its eggs by means of a pointed *Ovipositor* (q. v.) in the backs of oxen. The presence and development of the larva gives rise to a tumour known to agriculturists as a *wooril* or *woorle*. This is filled with purulent matter, upon which the larva feeds; and at the proper time the larva emerges from its tumour, and undergoes its further development in the ground. An open sore is sometimes left in the ox's back after the exit of the larva. The adult fly is about half an inch in length, with brown wings and head, a black thorax or chest, and a whitish abdomen with a black band running round it. The sheep-bot (*Cestrus* or *Cephalemyia ovis*) deposits her eggs in summer in the nostrils of the sheep, the larvæ passing up to the *frontal sinuses* or spaces in the frontal bone, where they lie until the following spring, and pass down the nostrils to become pupæ, and to undergo their further development. These larvæ cause much irritation, and may even cause death by gaining access to the brain. The sheep-bot is of small size, the face being yellow and the body of a general grey colour. It inhabits damp situations. Other species of bots affect deer, reindeer, goats, and other herbivorous mammals.

Both, Andries and Jan, Flemish painters, pupils of Blomerts, were born at Utrecht, the former in 1609, the latter in 1610. The brothers studied, travelled, and worked together on the same canvas, Jan painting the landscape part of the subject, and Andries the figures. So perfectly were they in accord in mind and manner, that their works, which are rare and very highly valued, seem the productions of a single hand. Of these, a *View of Italy—Sunrise*, and a *Defile*, are in the Museum of Paris. Andries was drowned at Venice in 1650; his brother returned to Utrecht, and died in 1651.

Bothnia, the Latinised form of the name given in the middle ages to the coast lands around the Gulf of B., comprising the present Osterbotten of Finland and the Swedish län of Westerbotten.—**Gulf of B.**, the N. part of the Baltic Sea, lies beyond the Åland Isles, and between Sweden and Finland. It is 400 miles long, and on an average about 100 broad, with a depth varying from 20 to 50 fathoms. Although it contains many sandbanks, rocks, and islets, it is the least dangerous portion of the Baltic for navigation, has numerous excellent havens, and from both Sweden and Finland receives considerable rivers. In winter it is usually frozen over, and can be crossed on sledges. The chief towns on the E. shore are Åbo, Vasa or Nikolaistadt, Uleåborg, and Tornæ, on the extreme N.; and on the W., Umeå, Hernösand, and Gefle.

Bothriocephalus, a genus of *Platyelmia*, or flat worms, allied to the tape-worms. A single species of this genus (*B. latus*) inhabits the intestines of man, but is peculiar in its distribution, inasmuch as it is parasitic only in the inhabitants of Russia, Sweden, Holland, Poland, and Switzerland. The head of *Bothriocephali*—other species of which occur in fishes and water birds—is provided with two elongated depressions, by means of which it adheres to the intestinal walls. The separate zooids or segments of this 'worm's' body are very broad in proportion to their length, and the generative pore or aperture opens on the flat surface of each segment, not at the margin or side, as in the common tape-worm. This worm may attain a length of from 15 to 25 feet, and is more easily expelled than the common tape-worm. Its developmental history is still imperfectly understood; but it appears to exist in an immature or sexless form in fishes and other marine animals, and undergoes full development only when introduced into the bird or man, as the case may be. It is said not to pass through a *cystic stage*, as observed in the tape-worm, but this is a very doubtful statement.

Both'well, a village of Lanarkshire, parish of the same name, on the right bank of the Clyde, 8 miles S.E. of Glasgow, and near which the splendid Norman ruin of B. Castle overlooks the Clyde. The old B. Bridge was the scene of the famous battle of that name, in which the Scottish Covenanters were defeated by the royal troops under Monmouth, June 22, 1679. Pop. of village (1871), 1209.

Bothwell, James Hepburn, Fourth Earl of, was born about 1526, and on his father's death in 1556 became the chief noble in the S. of Scotland. Handsome and ambitious, he was thoroughly unprincipled, and in turn favoured and opposed the Reforming party. In 1562 he attempted to seize the Queen's person, was imprisoned, escaped, and outlawed on shunning his trial. A fatal passion which he inspired in the breast of Queen Mary was, however, the means of reinstating him at court, when he took the side opposed to Moray, who from the first had been his enemy. There can be little doubt that the murder of Darnley, on the 9th of February 1567, when the house at Kirk-of-Field was blown up, was his act, though whether the Queen was an accomplice or not is still matter of dispute. The subsequent sham trial and acquittal of B. on the charge of murdering Darnley, followed by his obtaining the title of Duke of Orkney, and his marriage to Mary, 15th May 1567, was the ruin of both. The nation rose in revolt; Mary's soldiers refused to fight; she was brought back a prisoner to Edinburgh; while B. fled first to Orkney and then to Denmark, where he was imprisoned, after making a confession, it is asserted, in the Castle of Malmoe, exonerating Mary, seemingly at the instance of a certain Anna Trandson, who claimed him as her husband, and procured the promise of a yearly allowance. He died about 1577 in the Castle of Draxholm. (See Burton's *History of Scotland*.) His titles and estates were forfeited to the crown. B. has been the subject of dramas by Aytoun and Swinburne.

Both'y, the name given to houses on a farm in which unmarried men are lodged throughout the year, and to outhouses in certain counties of Scotland where women are accommodated during the time of potato-hoeing. Mr Stephens, in his *Book of the Farm*, makes the sweeping assertion that the B. system is a bad one, and that in his opinion 'it ought to be entirely abolished.' Mr Robb, in his little book entitled '*The Cottage, the B., and the Kitchen*, while from personal experience declaring that occasionally bothies are not fit for habitation, asserts that many of them are healthy and comfortable. He adduces various instances in Fife, Forfar, and Perth, where he found bothies with a general feeding-room, and with separate apartments for the various individuals. But there can be little doubt, that where the utmost care is not taken to secure cleanliness and comfort, the B. system is exceptionally pernicious to the moral habits of the peasantry.

Botonee, or **Botony**, in heraldry, is a Cross-Crosslet (q. v.), each arm of which terminates in the form of buds or buttons—usually three.

Bo-Tree, the name given to the banyan or peepul (*Ficus religiosa*) in Ceylon, where the Buddhists hold it in great reve-

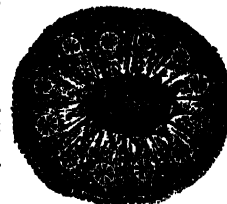


Bo-Tree.

rence. It is planted near the temples. One near the city of Anaraganpoora is believed, on good historical grounds, to be 2163 years of age. It is looked upon with peculiar veneration, but pilgrims are only allowed to take away the leaves when they fall, the tree being accounted too sacred to be touched with a knife. See Tennent's *Ceylon* (1860).

Botrych'ium, the moonwort, a genus of ferns, of the division *Ophthaloglossa*. There is only one British species, *B. lunaria*, which, though widely diffused, is not generally common. *B. virginica*, though not found in Britain, is widely scattered over Australia, Asia, Norway, and America, where it is known as the rattlesnake fern. Its roots are boiled and eaten in the Himalayas, New Zealand, &c. According to Scottish folklore, witches, when they strode broomsticks in their midnight expeditions, used the moonwort for a saddle.

Botryll'us, a genus of compound *Ascidians* (q. v.) or *Tunicate Molluscs* (q. v.), found incrusting the stones and other marine objects. *B. violaceus* is the common species; and, as exhibited in the accompanying cut, these organisms consist of a number of individual tunicates, each possessing a distinct mouth, and united to form a compound mass by the fusion of the *tests* or outer layers of their bodies. A common anal or excretory orifice exists in the centre of the mass.



Botryllus Schloeseri.

Botry'tis, a genus of fungi of the division *Hyphomycetes*, containing various plants, which constitute Mould (q. v.), Mildew (q. v.), &c. The genus consists of a thread-like mycelium, which enters into and penetrates through the tissues of the plant or other object, on which it becomes parasitic, and sends up a cellular shoot, which bears the fructification at its extremities. A species of B. constitutes the silkworm rot, or Muscardine (q. v.), and another (*B. parasitica*) is very destructive to turnips. *B. infestans* is by many observers believed to be the cause of the Potato Disease (q. v.).

Bott'a, Carlo Giuseppe Guglielmo, an Italian historian, physician, and poet, was born at San Giorgio, Piedmont, 6th November 1766, studied at Turin, and in 1794 was appointed physician to the French army of Italy. He was elected a member of the Piedmontese *Consulta* in 1800, but incurred the displeasure of Napoleon by colling some of his measures despotic, and ceased to be a member of the legislative body in 1814. B. was subsequently for some time rector of the academy at Rouen, and died in Paris, 10th August 1837. His most important work is *Storia d'Italia, 1490 ad 1814* (20 vols. Par. 1832), the portion from 1490 to 1534 being a republication of Guicciardini. Among his other productions may be mentioned *Histoire de l'Amérique* (Par. 1809), and *Il Camillo, o Vejo Conquistata* (Par. 1816), a poem in twelve cantos, full of noble versification and striking beauties. See *Vita di B.* by Dionisotti (1868), and B.'s *Letters*, published by Paolo Pavesio at Turin in 1875.—**Paul Emile B.**, son of the preceding, a celebrated traveller, was born in 1805. After a voyage round the world, he went in 1830 to Egypt as a physician, and accompanied the Egyptian expedition to Sennaar in this capacity, at the same time making a zoological collection. When French Consul at Alexandria, he undertook a journey into Arabia in 1837, the account of which is given in his *Relation d'un Voyage dans l'Yémen* (1841). He was then appointed consular agent at Mosul, where he began his explorations in 1843, and soon after discovered the ruins of Nineveh, described in his *Monument de Ninive*, with fine illustrations by M. E. Flandin (5 vols. Par. 1849-50). A cheaper edition of this work appeared as *Inscriptions découvertes à Khor-sabad* (1848). B. went as General Consul to Jerusalem in 1847, and to Tripolis in 1857. He returned to France in 1868, and died in April 1870, at Achères, near Poissy. B. greatly enriched the Louvre with his discoveries, and earned for himself an honourable name as the pioneer of Assyrian archæology.

Bott'a'ri, Giovanni Gastano, an Italian scholar and *savant*, was born at Florence, January 15, 1689. He superintended a new edition of the Dictionary of the Della Crusca Academy; and having gone to Rome in 1730, became Professor of Church History and Polemical Theology in the College of La Sapienza, assisted Manfredi to determine the level of the Tiber, and subsequently became librarian of the Vatican and Canon of Santa Maria Transteverine. B. died at Rome, June 3, 1775. Of his numerous works may be mentioned his *Virgil*, from the Vatican MS. (1740); his dissertations on Dante, Boccaccio, and Livy,

his *Del Museo Capitolino* (2 vols. 1741 and 1750); and his treatises on the Catacombs of Rome and on the Vatican. See *Grazzini, Elogio di M. Giov.-Gast. B.* (Flor. 1818).

Böttger, or Böttcher, Johann Friedrich. See PORCELAIN MANUFACTURE.

Böttger, Karl August, a German antiquary of repute, was born, June 8, 1760, at Reichenbach, in Saxony. After studying at Leipsic, he became Director of the Gymnasium at Weimar (1791), where he associated with Goethe and Schiller. In 1804 he left this literary centre for Dresden, the art-capital, and there lectured on archæology and art. B. was chosen member of the French Institute in 1832, and died November 17, 1835. Among his chief works are *Sabina, oder Morgenscenen einer reichen Römerin* (Leips. 1803); *Griech. Vasengemälde* (Weim. and Magd. 1797-1800); *Ideen zur Archæologie der Malerei* (Dresd. 1811); *Vorlesungen und Aussätze zur Alterthumskunde* (Altenb. 1817); *Kunstmythologie* (Dresd. 1811); *Amalthæa* (Leips. 1821-25); and *Ideen zur Kunstmythologie* (Dresd. and Leips. 1826). See *Karl Aug. B., eine biographische Skizze* (Leips. 1837), by his son, Karl Wih. B., who died in 1862, after obtaining a respectable name as a writer of histories and biographies.

Bottle (Fr. *bouteille*, from *botte*, a bunch), a vessel with a narrow neck for holding liquids, commonly made of Glass (q. v.) or stoneware. In early times animal skins were fashioned into bottles, and even now vessels of leather are used by many Asiatic tribes.

Bottle-Chart is a marine chart showing the probable route which a sealed bottle, thrown into the sea at some point in mid-ocean, would take in reaching its destination. From numerous instances, Captain Beecher, an English naval officer, has constructed such a chart; and as the track which the bottle takes must depend chiefly on ocean currents, a method is thus suggested for the determination of such currents. See CURRENTS.

Bottle-Gourd, the fruit or 'gourd' of *Lagenaria vulgaris*, so called from being frequently used to hold liquids.

Bottlehead or Bottlenose Whale (*Globicephalus*, or *Phocaena globiceps*, or more recently *Hyperoodon hidontatus*) a genus of Cetacea belonging to the *Delphinidae* or Dolphin family, and sometimes known as the 'Caing Whale' of the Orkney and Shetland Islands. The B. is, however, not a true whale, but is more nearly allied to the dolphin. The forehead is high and round, the muzzle projecting to form a short beak; two small teeth exist in front of the lower jaw, and one dorsal fin is placed far back on the body. The single nostril or blowhole is crescentic in shape. The skin is smooth, the body being black or leaden on the back, and light or whitish on the belly. Bottle-whales may attain a length of 20 or 25 feet, and are gregarious in habits. They are frequently captured by being driven on shore, the entire flock following the example of a stranded leader. When captured they make a great noise by bellowing. They generally swim near shore, and sometimes enter rivers and harbours, presumably in pursuit of herrings and other fishes.

The *Delphinus tursio*, a species of true dolphin, with a round forehead and long slender beak, occasionally found around the British coasts, has sometimes also been named the 'Bottlenosed Whale.'

Bottle-Tit, a name given to the long-tailed titmouse (*Parus caudatus*), a familiar British species of *Dentirostral Insessores*, or Perching Birds, forming the sub-family *Parinae*.



Bottle-Tit.

The colour is grey on the head, throat, and cheeks, a band of black passing over the eye, extending over the shoulders and back; whilst the central tail-feathers are black. The wings are black, and the shoulders and lower back are reddish. The average length is 5½ inches. The eggs are usually very numerous, ranging from eight to sixteen in number.

Bottom, as a nautical term, means strictly that portion of a ship which is under water; but in a more general sense it signi-

fies the ship itself, as in the expression, a trade in British bottoms.

Bott'omry, Bond of, is a mortgage which the owner of a ship gives for outfit or repairs given to enable him to proceed on his voyage. The bond is so called because the keel or *bottom* of the ship is pledged figuratively, to denote the whole of it. In this contract it is understood that if the ship be lost, the lender loses the whole of his money; but that if it return in safety, he shall be paid the principal sum, with whatever interest upon it may have been stipulated for. The amount of loan on B. B. is not in England restricted by law, though it is so in many maritime states. The bond commonly states the risks to which the lender is liable. Usually they are the same as those for which the underwriter is liable under a policy of insurance. See CAPTURE; RESPONDENTIA, BOND OF.

Botzen, Bozen, or Bolzen (Ital. *Bolzano*), a town beautifully situated in the circle of Brixen, Austrian Tyrol, on a small branch of the Talfer, 70 miles N. of Verona, 115 S. of Munich, and 255 S.W. of Vienna, with which places it is connected by rail. It is a flourishing entrepôt, and has manufactures of silks, linens, leather, and hosiery. It has a cathedral of the 14th c., several fine Italian buildings and arcaded streets, and lies in a district rich in wine and fruits. Pop. (1869) 9355.

Bouchain, a fortified town in the department of Nord, France, and a station on the railway between Cambrai and Lille, lies on the Scheldt, 120 miles N.N.E. of Paris, with some industry in beet-sugar making and salt refining. It was captured by the Duke of Marlborough in 1711, and recovered by the French in the following year. B. has the means of flooding the adjacent country as a mode of defence. Pop. (1872) 1039.

Bou'cher, Francois, a French painter and engraver, born at Paris, 29th September 1703, studied under Le Moine, from whom he received the traditions of Rubens, and in 1723 gained the first prize for painting. Two years later he went to study at Rome, became a French Academician in 1734, and court painter in 1765, and died at Paris, May 30, 1770. B. was marvellously expert in work, but it was not of a high or pure kind, any more than his own life. French critics say that it seduced and perverted many a young artist; and one notices with pleasure that his reputation fell at the Revolution. Among his more notable productions are *Venus ordering Arms for Æneas* (1732), *The Bath of Diana* (1742), and *Portrait of Mde. de Pompadour* (1757). His engravings are very numerous.

Bouches-du-Rhone, a maritime department in the S.E. of France, situated at the mouths of the Rhone, hence its name. Area, 1971 sq. miles; pop. (1872) 554,911. It was formerly part of Provence, and consists in the S.W. and along the banks of the Rhone of partly cultivated plains (*La Camargue* and *La Crau*), but in the E. portion it is invaded by the lower offsets of the Maritime Alps. It is bounded on the N. by the Durance, and on the W. by the Rhone, which before entering the Mediterranean divides into two great arms, enclosing the delta, *Ile de la Camargue*. The climate is excessively hot for France, and mainly owing to this only about one-fourth of B. is cultivated, producing corn, rice, figs, the olive and mulberry. There is much cattle-rearing. The soil in many parts is impregnated with salt, and there are many salt lakes connected with the sea, the chief of which is the Etang de Berre (q. v.). Marseille is the capital; Aix and Arles are the only other towns of large size. There are many small ports with considerable trade. B. holds the first rank for international trade among the departments of France. It has several extensive canals, and is traversed by the railway *Paris à Lyon et à Marseille*, with branches to Nîmes, Aix, and Nice.

Bou'icault, Dion, actor, dramatist, and theatrical manager, was born at Dublin, December 26, 1822, and was educated at London University, but early showed a strong liking for the stage. In 1841 his comedy of *London Assurance* was produced at Covent Garden, and acquired a more legitimate success than perhaps any of his later and more popular dramas. It is throughout crude and lacking in originality, but is enlivened by sprightly cross-play of character, and much specious but effective dialogue. B. has since shown himself singularly prolific and versatile in the production of plays, of which some of the chief are his *Colleen Bawn* (1860), a clever adaptation of G. Griffin's Irish novel, *The*

Collegians; The Octoroon (1861); *Flying Scud*, a dramatic exposure of turf chicanery (1866); *After Dark* (1868); *A Dark Night's Work* (1870); and *Formosa* (1871). In his later works B. has let all the legitimate arts of the dramatist give place to vulgar 'sensational' incidents, culminating in a plot of violent improbability. He is also known as the founder of the 'upholstery school' of art, the main features of which are complete command of stage mechanism, and an uncompromising realism in matters of dress, furniture, &c. B. is favourably known as an actor of Irish parts. His wife (*née* Miss Robertson) has also earned the reputation of a popular actress.

Bou'doir (from the Fr. *bouder*, to pout or be sulky), a room to which a lady may retire when she wishes to be alone, or to receive only her more intimate friends. The fashion of having boudoirs was introduced by the mistresses of Louis XIV., but the word itself has existed from the 13th c.

Bou'farik, a town and military station of Algeria, 16 miles S.S.W. of Algiers by rail, with trade in esparto grass, tobacco, cattle, and fruit. Pop. (1872) 2588.

Bouffiers, Louis-François, Duc de, peer and marshal of France, son of François II., Count of B. and Cagni, born 10th January 1644, entered the army in 1662, served with great distinction under Condé, Turenne, Crequy, Luxembourg, and Catinet in Germany and the Netherlands, and died at Fontenelleau, March 22, 1711. Few soldiers of his time saw more service, and the record of his exploits is only to be found in the military history of the latter half of the 17th c. For his gallant and determined defence of Lille against the allied armies he was appointed 'perpetual governor' of that city, and after the defeat at Malplaquet, so masterly was his command of the retreat, that neither men nor cannon were allowed to fall into the enemies' hands.

Bouffiers, Stanislas, Marquis de, son of a French nobleman in the service of Stanislas, King of Poland, was born at Lunéville in 1737. His first considerable appointment was that of governor of Senegal and Goree, where his wise and beneficent administration is not yet forgotten. On his return to France he became a prolific writer of light literature; in 1789 he was chosen a member of the States-General; but after August 10, 1792, left France, and received from Friedrich Wilhelm an extensive estate in Prussian Poland. In 1800 he returned to France, resuming his former literary pursuits; in 1804 was admitted a member of the Institute, and died 18th January 1815. A collected edition of his works was published at Paris in 1813, in 2 vols.

Bougainville, a bay, island, and strait, named after B., the French navigator. The bay is in Patagonia, on the N. side of the Strait of Magellan; the island belongs to the Solomon group, E. of New Guinea, Polynesia, and is hilly and populous; and the strait is in the New Hebrides, separating Mallicollo on the S. and Espiritu Santo on the N.

Bougainville, Louis Antoine de, a famous French navigator, was born at Paris, November 11, 1729. On the outbreak of the Seven Years' War in 1756, he accompanied the Marquis of Montcalm to Canada as aide-de-camp; and in June 1758 successfully withstood, with a force of only 5000 French, an English army of 24,000. In 1766-69 he undertook a voyage round the world, of which he gives an account in his *Description d'un Voyage autour du Monde* (2 vols. 1771-72; new ed. 1861). B. distinguished himself in the N. American war on the side of the colonists, and was made a field-marshal in 1780. At the outbreak of the Revolution he retired into private life, and died August 31, 1811.

Bought and Sold Notes are notes signed by a broker of goods sold through him. They are held to complete the transaction. They are not used in Scotland.

Bou'gies are instruments used by surgeons for dilating any of the mucous membranes of the body. They are generally made of metal, gum-elastic, catgut, or vulcanite. Metal B. may be solid or hollow. The metal may be block-tin, German silver, silver, or steel. When used for dilating the urethra in Stricture (q. v.), B. are shaped so as to enable the surgeon readily to introduce them into the bladder.

Bou'guer, Pierre, an eminent French mathematician and natural philosopher, was born at Le Croisic, in Bretagne, 16th February 1698, and in 1713 succeeded his father as Professor of Hydrography in his native town. In 1730 he obtained a similar office at Havre. From 1735 to 1742, together with Godin and De la Condamine, he measured a degree of the meridian in Peru. We are also indebted to him for valuable researches on the intensity of light, and for the invention of the heliometer. B. died August 15, 1758. His principal works are *Théorie de la Figure de la Terre* (1749), *Traité d'Optique sur la Gradation de la Lumière* (1760), and *Traité de la Navigation* (1769), the last two published posthumously by Lacaille.

Bouill'e, François Claude Amour, Marquis de, a French general, born 19th November 1739, at the Château du Cluzel, in Auvergne, where his ancestors had been established since the 11th c. He served with distinction in the Seven Years' War, was for twenty-eight years governor of Guadaloupe, during which time the American war broke out, when he was appointed commander-in-chief of the French West Indian forces, and captured in succession seven islands from England. In 1784 he visited England, and in recognition of his gallantry and humanity was presented with a sword by the city of London, and received a high encomium from the Queen in person. He advised the escape of Louis XVI., but by an unavoidable delay of two hours on the part of the troops commanded by B., Louis was captured at Varennes, June 20, 1791. This and a subsequent attempt to induce the Empress Catherine II. to supply 36,000 men for the invasion of France, made it prudent for B. to retire to England, where he died, 14th November 1800. His *Mémoires sur la Révolution Française* (Par. 1801), republished by MM. Berville and Barrière, is a work of much value. A new edition appeared in 1859.

Bouill'on (Ger. *Beulen*), originally a German duchy, but now the western portion of the Belgian Grand-duchy of Luxemburg, lies near the French frontier, and embraces a woody and hilly stretch of the Ardennes, containing a town of the same name and twenty-one villages. It once belonged to Godfrey of B., the famous crusader, who in 1095 pawned it to the Bishop of Liege to raise money for the expedition. After many vicissitudes it was finally incorporated with Belgium in 1837. Area, 157 sq. miles; pop. 21,000.—The town of B., the old family residence of the Dukes of B., is situated on the Semoy, among steep hills, 10 miles N.E. of Sedan, has a pop. of 4000, a strong castle, and some cloth and woollen manufactures.

Bouillon, Godfrey de, Duke of Lower Lorraine, 'a worthy representative of Charlemagne, from whom he was descended in the female line,' was born about 1061. His father was of the great family of the Counts of Boulogne, and Brabant, the lower province of Lorraine, was the inheritance of his mother. B. gained distinction in the armies of the Emperor Heinrich IV., and was the great leader of the first Crusade. According to the chroniclers, he performed prodigies of strength and valour against the infidels, and was unanimously proclaimed King of Jerusalem on its capture in 1099. 'But in a city where his Saviour had been crowned with thorns, the devout pilgrim rejected the name and ensigns of royalty' (Gibbon). He took the title of Defender and Baron of the Holy Sepulchre. At Ascalon, with 20,000 men, he defeated the Sultan of Egypt with 400,000. He then devoted himself to organise his government, and drew up, for his courts of justice, the Assizes of Jerusalem, a code of laws which was the fullest embodiment of feudal jurisprudence. He died in 1100, and was buried on Mount Calvary. His many virtues are justly extolled in Tasso's *Jerusalem Delivered*. See Gibbon's *Decline and Fall of the Roman Empire*, ch. 58.

Bouill'y, Jean Nicolas, a French dramatist, born at Coudraye (Indre-et-Loire) in 1763. His first piece, *Pierre le Grand*, represented 13th September 1790, containing a couplet at the close complimentary to the Queen, procured for the author a present from her Majesty, which, some years after, as a confession of his error in having accepted it, he gave to the Society of Jacobins at Tours. He was called to the bar, and filled several important administrative and judicial situations in Tours, which he ultimately resigned to prosecute the drama. He also composed tales for the young. B. died at Paris, 14th April 1842. Of his numerous theatrical pieces may be specified *Jean Jacques*

Rousseau à ses derniers Moments (1791); *Les Irlandais-Unis* and *La Mort de Turenne* (1793); *La Famille Américaine* (1796); *Rend Descartes* (1796); *Lénore* (1798); *L'Abbé et l'Épée* (1800); *Madame de Sévigné* (1805); and *Haine aux Femmes* (1808). See *Quérard's Supplément à la France Littéraire*.

Boulainvilliers, Henri de, Comte, son of François, Comte de B., was born at St Saire, 11th October 1658. Educated at Jully, he entered the army, but pecuniary losses induced him to devote himself to study, when he chose for his subject the origin and growth of the great feudal families of France, which, unlike his monarchist predecessors, Daniel, Mézeray, &c., he regarded as the most important and durable element in the constitution. He also studied judicial astrology, and wrote a *Life of Mahomet* and a *History of the Arabs*. B. died 23d January 1722. His religious position is a disputed question. It is unlikely that a conservative antiquarian should be an infidel. (See vol. xvi. of Voltaire's Collected Works, *The Count of B.'s Dinner*.) B.'s chief works are *Histoire de l'Ancien Gouvernement de la France* (Hague, 1727); *État de la France* (Lond. 1727); and *Histoire de la Pairie de France et du Parlement de Paris* (Lond. 1753). B. must be judged by reference to his time, of which it has been said that Louis XIV. made 'of a great fief a great kingdom, and destroyed the feudal government of eight centuries, which Richelieu had already undermined.'

Boul'ay de la Meurthe, Antoine Jacques Claude Joseph, Comte, a French statesman, born at Chaumoncy, in the Vosges, February 12, 1761, is chiefly remarkable on account of his staunch adherence to the Empire. He was a member of the Council of Five Hundred (1797), where he opposed Jacobinism and declared moderate Revolution principles. In 1799 he issued an *Essai sur les Causes qui en 1649 amenèrent en Angleterre l'Établissement de la République, sur celles qui l'y firent périr*, a work which at once went through four large editions, and was widely read in the light of passing events. After the *coup d'état* of the 18th Brumaire, which he supported, he was three times made president of the legislative section of the Council of State, was the principal editor of the *Code Civil*, and for some time Minister of State. He was proscribed by the ordinance of July 24, 1815, following the second restoration, and resided in Germany till 1819, when he was allowed to return to France. From this period he lived in retirement, and died at Paris, February 2, 1840. B. published, when exiled from France, the *Tableau Politique des Règnes de Charles II. et de Jacques II., Derniers Rois de la Maison de Stuart* (2 vols. Buss. 1818), and after his return, *Bourienne et Erreurs Volontaires et Involontaires* (2 vols. Par. 1830).—**Henri-George, Comte B.**, son of the preceding, born at Paris in 1797, was a well-known philanthropist and social reformer. In 1848 he was elected a member of the National Assembly, where his popularity among moderate republicans led to his being made vice-president of the Republic in 1849. Subsequently he was a senator under the Empire (1852), and held various offices. He died at Paris, November 24, 1858.

Boulder, the name applied in geology to large blocks or masses of rock which are generally deposited in localities far removed from their original place of formation or situation. They may thus form prominent objects in a flat plain, and be utterly irreconcilable in mineral structure with surrounding and adjacent rocks. Boulders present valuable sources of the evidence of ice or glacial action, inasmuch as they may generally be found to have been transported to their present position through ice agencies; and they may bear on their surface ice-scratches and other typical markings. Boulders occur frequently throughout the various regions of the world.

Boulder Clay, Drift, or Till, a deposit belonging to the most recent *Pleistocene* or *Post-Tertiary* period of geology, and characterised by its consisting of unstratified clays, in which numerous masses of stone and boulders, varying greatly in size, are embedded. The B. C. is very generally recognised as the oldest of the *Pleistocene* deposits, but it is not always easy or possible to arrange these superficial formations in a definite or exact order. The colour and composition of the B. C. varies according to the source from which its materials have been derived. In a region where carboniferous shales prevail, the clay is of leaden grey or black colour, whilst in the neighbourhood of the Old Red Sandstone formation it may be red.

The impacted boulders vary in size from mere sandy grains to large rock masses several feet in length and several tons in weight. They exhibit *stria* or grooves and ice-markings; and from the direction of these markings it is often possible to indicate the line of motion of the ice mass which produced them. The rocks on which the B. C. rests, are generally rubbed and polished in a striated manner, and resemble thus the *roches moutonnées* of modern glacier districts. In some districts of Scotland, beds of sand, clay, and gravel, containing peaty vegetation and mammoth remains, appear intercalated with the boulder clays. The presence of such beds seems to indicate that warmer periods occurred periodically during the glacier period, when the ice thawed, and allowed a partial return of flora and fauna. The fossils of the B. C. are not characteristic or numerous. Shells derived from older formations and washed into the clay are found, whilst the remains of the mammoth, woolly rhinoceros, and other extinct mammals, are interspersed through this and allied formations. Certain glacial shells, generally of Arctic nature, occur in the clay, having been borne from the Arctic regions with the ice-drift of old. The B. C. is thus intimately and characteristically associated with the glacial or ice period, and of itself contributes no small share of evidence towards the due establishment and recognition of the latter epoch of recent geology.

Boulevards, or Boulevarts (Fr. from German *bollwerk*, Eng. *bulwark*), originally meant the ramparts of a fort or fortified town, but now used to designate the public walks which, in Paris and other towns, occupy the line of the former city walls, and which are usually wide promenades and carriage-ways lined with trees. The original and most famous B. are those of Paris, of which that running between the Bastille and the Madeleine is 2½ miles long. The Thames Embankment (see LONDON), though not occupying the site of former defences, is essentially a boulevard, and is one of the finest examples of that variety of promenade in the world.

Boulogne, a market-town in the department of the Seine, beautifully situated S.W. of Paris, about a mile beyond the fortifications, on the right bank of the Seine, and connected with St Cloud by a fine bridge. It has a quaint church of the 14th c., and near it is the castle of Rothschild. Pop. (1872) 18,687. The *Bois-de-B.* is a beautiful wooded park for recreation, extending from B. as far N. as Neuilly, between the fortifications and the Seine. It has three ornamental sheets of water, and is intersected by numerous alleys and drives.

Boulogne-sur-Mer, a seaport and bathing-place, department of Pas-de-Calais, France, at the mouth of the Liane, 19 miles S.W. of Calais, and 139 N.N.W. of Paris, with which places it is connected by rail. It is divided into Upper and Lower B., the latter of which, the maritime part of the town, is the most modern and fashionable. The chief buildings are the Hôtel de Ville, built in 1774; the modern Church of Notre Dame, in the Greek style; and the citadel, of the 13th c. The ramparts have been in part converted into fine promenades. There are also here the ruins of an antique lighthouse, said to have been built by Caligula; the marble column of Napoleon, 165 feet high; an extensive museum; one of the best bathing establishments in France; an hospital, barracks, large theatre, &c. The harbour admits vessels of 800 tons, has two long piers, and is protected by several forts. B. has a considerable coast trade, and communicates by steamer with London daily (9 hours), and with Folkestone twice a day (2 hours). The principal manufactures are cement, steel pens, linens, sailcloth, and beer. There are also extensive oyster and herring fisheries, while the fine sands attract annually a large number of visitors. Pop. (1872) 38,514, of whom many are English. B., originally a port of the Morini, was first called *Gesoriacum*, but received from the Romans the name *Bononia*, changed under the Karolings into *Bolonia*. It was destroyed by the Norsemen (9th c.), rose again from its ruins, and was taken by Henry VIII. of England in 1544, and again restored by Edward VI. to France in 1550. B. was the point where, for the purpose of invading England, Napoleon concentrated his forces in 1804, and also where Louis Napoleon landed on his second attempt to overthrow the rule of Louis Philippe, August 6, 1840.

Boul'ton, Matthew, an English engineer and mechanic of merit, born at Birmingham, September 3, 1728. He is the

author of several important inventions, notably a new process of inlaying steel, and improvements in the machinery for coining, but is best known as the partner of James Watt, with whom he established a steam-engine factory (the firm being B. & Watt) in 1769, which long supplied all Europe. B. died at Soho, near Birmingham, 17th August 1809.

Bound, or Boundary. The boundaries of boroughs, cities, and towns in England and Scotland are regulated by various statutes of the reign of William IV. The boundaries of parishes are chiefly preserved by the ancient usage of *Beating the Bounds*. See PARISH. Various Acts of Parliament have been passed permitting and regulating the subdivision of parishes for ecclesiastical purposes, or *quoad sacra*, as it is called in Scotland.

Boundary Survey of Ireland.—This is provided for by various Acts of Parliament. These confer powers on the boundary surveyor to rectify errors in the names of lands in the Ordnance county maps, also to define the boundaries of parishes. Reports and plans are open free to public inspection at the Council Office in Dublin.

Bound Bailiff, the name of a sheriff's officer, corrupted by the people into *bun-bailiff*. See BAILIFF.

Boundary Charter or Infeftment is, in the law of Scotland, a charter which describes the boundaries or 'marches' of land conveyed by it. It confers right to all within the bounds, and excludes it to all beyond. When a common wall is intended to be conveyed, this must be stated.

Bounty. The money given to men to induce them to enter the army or the navy is so called. The only B. at present given is what is called a *free kit*; that is, an equipment free of expense to the soldier in various necessities—shirts, boots, brushes, &c. In former times, when a high pecuniary B. was given, the soldier was made to pay highly for his kit, the B. thus becoming to a considerable extent nominal. In the Napoleonic wars, as much as £18 to £20 per head used to be given as B. It has always been higher in cavalry and in artillery regiments than in the infantry. In the royal navy, the term B. denotes the distribution of money sometimes made to officers and men on special occasions during active service.

Bounty, in political economy, is a grant by the state for the encouragement of a branch of national trade or industry. Thus in former times there were bounties on the exportation of corn, in the belief that they would encourage agriculture at home, and there were bounties on the importation of certain articles of colonial produce with the view of encouraging colonial industry. A B. then simply meant a tax upon the community for the benefit of a section of it; that is, a tax upon general industry in order to encourage a particular industry. The result of this is that men are induced to forego suitable occupations for others which are naturally unsuitable for them. The man who would have been a clever mechanic becomes a bad farmer, and so on. A B. is simply a measure of *protection*; and, as such, a misdirection of capital, industry, and talent. It is to be regretted that the B. system still greatly prevails in Europe.

Bounty, Mutiny of the, one of the most remarkable mutinies on record, took place 28th April 1789, on board H.M.S. *Bounty*, 215 tons, under Captain Bligh (q. v.), bound from Otaheite to the W. Indies, with some 1015 bread-fruit trees. It arose seemingly out of discontent on the part of the crew with the strict discipline of the ship after a long and delightful stay at Otaheite. When fourteen days out from the island, according to a concerted scheme, twenty-five of the men, headed by Fletcher Christian, mutinied, cast Bligh and eighteen others adrift in the ship's launch, and returned to Otaheite. Here sixteen of the men took up permanent residence, while the others, fearing pursuit, sailed to Pitcairn Island (q. v.), where, after a period of mad debauch, they founded a flourishing colony. Meantime, Bligh and his comrades, after a dreadful voyage of 3600 nautical miles, reached the island of Timor, to the E. of Java. On his return to England, Bligh published a *Narrative*, which roused a storm of excited feeling. The frigate *Pandora* was sent in search of the recreants, and succeeded in capturing ten of the number, who were brought to England and tried by court-martial, seven being acquitted and three being hanged, October 1792. See Sir J. Barrow, *The M. of the B.* (Lond. 1835); Lady Belcher, *The Mutiniers of the B., and their Descendants in Pitcairn and Norfolk Islands* (Lond. 1870).

Bounty, Queen Anne's, is the name given to a fund appropriated to increase the incomes of the poorer clergy of the Church of England. When Henry VIII. abolished the authority of the Pope in England, he annexed the 'first fruits' and 'tenths' to the crown. The *first fruits* are the profits of the first year of spiritual preferments, and the *tenths* are one-tenth of their annual profits, both chargeable according to the ancient declared value of the benefice—poorer livings being exempt from the tax. Under the Act 2 and 3 Anne, c. 11, it is formed into a fund for the augmentation of poorer livings and for the rebuilding of parsonages. Queen Anne's Act has been amended by various statutes. The fund is now administered by a corporation, entitled 'The Governors of the B. of Queen Anne for the Augmentation of the Maintenance of Poor Clergy.' The sum allowed to each augmentation is £20. Livings below £10 a year have the first claim, those below £20 a year the next, and so on in order while any remain under £50. Any living not above £45 a year may be specially augmented by £200 by the B., if privately augmented by the same sum. The money is to be expended on land to be annexed to the benefice.

Bounty Islands, a group of uninhabited rocky islets 480 miles E. of the S. Cape of New Zealand, situated in 47° 40' S. lat. and 179° E. long. They lie in the track of vessels bound from Bluff Harbour, New Zealand, round Cape Horn.

Bouquet of Wine, the aroma or flavour of wine, which is the chief element in determining the value of any variety.

Bourbon, the name of one of the most ancient feudal families of France, connected with the beautiful province of Bourbonnais, lying to the N. of Auvergne, and watered by the Cher, the Allier, and the Loire. The family first emerges into public history by the marriage, between 1270-85, of Robert, sixth son of St Louis, Comte de Clermont, &c., to Beatrice of Burgundy, who, through her mother, Agnes, daughter of Archambault, was heiress of B. Thus two lines of royal blood from Robert the Pious were united. Robert's son Louis acquired La Marche, and was made a duke. The next duke, Pierre, fought at Crecy and Poitiers; his brother Jacques (of La Marche and Castres), 'the Flower of Chivalry,' accompanied King Jean II. as a prisoner to England. Louis III., Duc de B., became very powerful in the reign of Charles V. (the Wise), who married the duke's sister, Jeanne, and sent Du Guesclin and Jean de B. (the founder of the line of La Marche and Vendôme) to Castile, chiefly that the cruelties of Pedro towards his wife, Catherine de B., might be punished. The son of this Comte de la Marche fought against Bajazet in Hungary, became Great Chamberlain of France, married Joanna II. of Naples (1415), and finally became a Franciscan monk. Jean I., to whom Auvergne belonged, was in the meantime taken prisoner at Agincourt. His grandson, Duc Pierre (Beaujeu), married Anne, eldest daughter of Louis XI., and acted with her in the regency during the minority of Charles VIII. and his absence in Italy. Their daughter Susanne married her cousin, Charles de Montpensier, the great Constable of B. (born at Moulins, 1489), Louis XII. renouncing the royal rights reserved to the duchy. The Constable, after his brilliant victory of Marignano and defence of Milan, deserted the French cause for that of Charles V., defeated François I. at Pavia (1525), and finally perished at the storming of Rome (1527). For a time the estates were confiscated to the crown, but part was recovered by the B.-Vendôme family, which now became the eldest branch, represented by Charles, Duc de Vendôme, the Duc de Montpensier, and the Prince de la Roche-sur-Yon. Antoine, the son of Charles, and brother of Cardinal B. and the Prince of Condé, married Jeanne d'Albret, inherited the kingdom of Navarre, and bequeathed his feud with the Guises to his son, Henri IV., who succeeded the Angoulême branch of the house of Valois on the throne of France, the Salic law excluding the daughters of Henri II. The posterity of Louis Hutin was thus brought back to the throne. Of the children of Henri IV. we need mention only his successor, Louis XIII. (1610-43), who married Anne of Austria, daughter of Philip III. of Spain; Elizabeth, married to Philip IV. of Spain; and Henriette, married to Charles I. of England. Louis XIII. had two sons—Louis XIV., who married Maria Theresa, daughter of Philip IV. of Spain, and reigned till 1715; and Philippe, Duke of Orleans, the head of the Orleans branch, of which Louis Philippe (Égalité), beheaded in 1793, and his son, King Louis Philippe

(1830-48), were members, and which is now represented by Louis Philippe Albert, Comte de Paris, eldest son of the eldest son of King Louis Philippe. Louis XIV. was predeceased by his son, Louis Dauphin, and his grandson, Louis, Duke of Burgundy. The second son of the former was Philippe, Duc d'Anjou, the first of the Spanish Bourbons, who succeeded after the Spanish Succession War under the will of Charles II. The only surviving son of the Duke of Burgundy was Louis XV. (1715-74), who married Marie, daughter of the Polish King Stanislas. His son Louis Dauphin predeceased him, leaving a large family, of whom Louis XVI. (the husband of Marie Antoinette, sister of the Emperors Joseph II. and Leopold II.) was beheaded in 1793; Louis (Xavier), Comte de Provence, became Louis XVIII. (1815-24); Charles Philippe, Comte d'Artois (husband of Maria Theresa of Saxony), became Charles X. (1824-30); and the famous Madame Elizabeth perished in the Revolution. The only surviving son of Louis XVI. died in prison in 1795; his only daughter, Marie Thérèse, married the Duc d'Angoulême, the eldest son of Charles X., but without issue. The Duc de Berri, second son of Charles X., married Maria Carolina, daughter of Francis I. of Naples, and left one son, Henri, Duc de Bordeaux, Comte de Chambord, who married Maria Louisa of Modena, and is now entitled, on Legitimist principles, to the throne of France. So late as 1873 (Salzburg Letter) he declined to make any constitutional concessions. Besides the Comte de Paris, whom we mentioned as representing the Orleans branch, there are many representatives of the five sons of King Louis Philippe who would, on Legitimist principles, be entitled on the failure of the Comte de Chambord or his heir-male. Philippe of Anjou, dying in 1746, was succeeded on the throne of Spain by his sons Ferdinand VI. and Charles III. The eldest son of the latter succeeded in 1788 as Charles IV., but abdicated in 1808 in favour of Joseph Bonaparte. In 1814 Ferdinand VII., the son of Charles IV., was restored to the throne, and, the Salic law being abolished in 1830, was succeeded in 1833 by his daughter, Isabella II., under the regency of Espartero and the Queen-mother Christina. The second son of Charles IV. was Don Carlos, who, excluded by the abolition of the Salic law, asserted his rights in the rebellion of 1834-39, and bequeathed them to his son ('Carlo Settimo'), who, after solemnly renouncing all claim to the throne, has involved his country in civil war for the second time in the 19th c. Isabella had to withdraw in 1869, since when there have been two periods of republican rule, with an interval of the feeble King Amadeus (abdicated 11th February 1873). In 1874 the B. branch was restored in the person of Alfonso, the son of Isabella. The second son of Charles III. was Ferdinand I., who received the kingdom of the Two Sicilies, which his father had obtained at the conclusion of the Polish Succession War. Ferdinand, who, after submitting to the usurpations of Joseph Bonaparte and Murat, died in 1825, was succeeded by his son, Francis I. (died 1830), his grandson, Ferdinand II., and his great-grandson, Francis II. (Bomba), who was expelled by Garibaldi in 1860. The fourth son of Philip V. of Spain was Don Philip, who in 1748 obtained the duchies of Parma and Piacenza, with clauses of return to Austria which never came into effect. His son, Ferdinand, entered into the Convention of 1801, by which the duchies were united to France. The son of Ferdinand was Charles Louis Ferdinand, who became King of Etruria, and whose son, Charles Louis (Duke of Lucca), obtained the duchies in 1847, on the expiry of the liferent of Maria Louisa, the ex-Empress of the French (a right she enjoyed under the Treaty of Paris). The attempts of Charles III. (assassinated 1854) and the Duchess Marie Thérèse (mother of Duke Robert) to govern with the help of Austrian troops were not successful; in 1859 the family was expelled, and the territory added to Sardinia, now Italy. See Coiffier-Demoret's *Histoire du Bourbonnais et des Bourbons* (2 vols. Par. 1828), and Achantre's *Histoire Chronologique et Généalogique de la Maison Royale de B.* (2 vols. Par. 1825).

Bourbon, Charles, Comte de Montpensier et de la Marche, Dauphin of Auvergne, and Duc de Bourbonnais, was born 17th February 1890, and eclipsed his contemporaries both as a politician and a soldier. The death of his elder brother, and his marriage with Susannah of B., put him in possession of the duchies of Bourbonnais and of Auvergne, and his great territorial influence was strengthened by his abili-

ties both as a statesman and a soldier. At the age of twenty-six, Francis I. made him Constable of France; in 1515 he gained the brilliant victory of Marignan, and within three weeks became master of Milan and Lombardy. His refusal to marry Louisa of Savoy, the king's mother, led to his being deprived of the estates he had received from his deceased wife and his mother-in-law, and by way of retaliation he formed an alliance with the Emperor Charles V. and Henry VIII. of England, from which the king in vain attempted to withdraw him. Having begun the siege of Marseille, the superior forces of the King forced him to relinquish it. Crossing the Alps, B., in the memorable battle of Pavia (25th February 1525), not only defeated Francis, but took him prisoner. Finding himself deceived by Charles V., he resolved to make himself independent in Italy, and on the 6th of May 1527, with an army unprovided with artillery, he appeared under the walls of Rome. In attempting to scale the walls, he was mortally wounded by a musket-ball, when he ordered his death to be concealed from the assailants. Two months later, his troops, who had meanwhile given themselves up to the pillage of the city, buried him at Gaeta. See Brantôme's *Vies des Grands Capitaines Étrangers*.

Bourbon, Ile de. See RÉUNION, LA.

Bourbon-Lançy, a town in the department of Saône-et-Loire, on the Loire, with mineral and hot springs, and many Roman remains. Pop. (1872) 1456.—**B. l'Archambault**, the *Aqua Bormonis* of the Romans, a town in the department of Allier, France, on the Barge, 15 miles W. of Moulins. It gave name to the family Archambault, has an ancestral castle of the Bourbons, a church of the 12th c., the remains of a feudal castle of the 15th c., with the celebrated tower of *Quinquengrogne*, and is noted for its hot springs. Pop. (1872) 2400.—**Bourbonne-les-Bains**, a town of France, department of Haute-Marne, on the Apance, celebrated for its hot saline springs, which are valuable in affections of the stomach and nerves. B. has a ruined castle and priory, a church of the 13th c., and some manufactures of tiles, plaster, and cutlery. Pop. (1872) 3949.

Bourbonnais, formerly a province of France, now comprising the fertile department of Allier and part of that of Cher. In 1327 it became the duchy of Bourbon, but was annexed to the crown in 1523. Moulins was the capital. See Allier's *Ancien B.* (Moulins and Par. 1839).

Bourbon Tea, or *Faham*, the dried leaves of the *Angraecum fragrans*, an orchid so called from being used as a substitute for tea in the Mauritius or Isle of Bourbon. It produces a soothing effect without causing sleeplessness, but is not much esteemed in London and Paris, into which it has been introduced.

Bourdaloue, Louis, one of the great French preachers, was born at Bourges, 20th August 1632, where, after being educated by the Jesuits for the Church, he lectured in the Academy for some time on humanity, theological ethics, &c. In 1669 he began to preach at St Louis (Jesuit Church), Paris, where Louis XIV. and his granddaughter soon brought the court to hear him. His popularity lasted many years. His sermons, based chiefly on the texts of Isaiah, St Paul, and St Augustine, were marked by profound moral earnestness and great logical power. They were delivered with shut eyes, and a sonorous but uninflected voice. B. advocated a return to primitive evangelism, and spoke plainly about the vices of the court. He was sent on a special mission to Languedoc on the revocation of the Edict of Nantes (1685), and there is no doubt that he was best fitted among the Catholic clergy to secure a hearing from the Huguenots. His later years were spent in the preaching and practice of charity. He died at Paris, 13th May 1704. His sermons were published by Bretonneau (18 vols. Par. 1707-34); recent editions are those of Méquignon (17 vols. Par. 1822-26), Lefèvre (Par. 1833-34), and Didot (Par. 1840). See Prigny's *Vie du P. B.* (Par. 1705); and Saint Arnaud's *Notice sur le P. B.* (Bourges, 1842). Mme. de Sévigné (*Letters*, 1674 and 1686) has left a striking picture of B.'s originality and power.

Bourdon de l'Oise, François Louis, a French revolutionist, born at Saint Remy, near Compiègne, about the middle of the 18th c. He was a procurator of the Parliament of Paris

ill 1789, when he embraced with ardour the cause of the Revolution. In 1792 he joined in the sack of the Tuileries; afterwards, as a member of the Convention, clamoured for the execution of Louis XVI., took part in the insurrection of 31st May, and latterly contributed to the downfall of the Girondists. Brutal and malicious in character, he deserted the cause of violence at the dictate of cowardice, and, as the reward of his perfidy, was banished by the Directory to Cayenne, where he died in 1797.

Bourg, the capital of the department of Ain, France, situated on the Reyssouze, 70 miles N.E. by N. from Lyon. It is the birthplace of Lalande, the famous astronomer, and has a statue of Bichat the anatomist, and an obelisk in honour of General Joubert. Near it is the church of Brou, rich in sculpture and coloured windows. Pop. (1872) 10,647, engaged in manufacturing linen, cotton, leather, and hoisery, and in trading in field produce.

Bourgelat, Claude, the founder of veterinary schools, and the creator of hippiatric science in France, was born at Lyon in 1712. He first followed law as a profession, but afterwards abandoned it for the military service, where his natural liking for horses was fostered. He was thus instigated to study the diseases to which such quadrupeds are subject, and conceived the idea of educating men for the treatment of these. Assisted by Bertin, a minister of Lyon, he opened in 1772 a veterinary school, which at once became famous, and is so to the present day, notwithstanding the many similar institutions which have since been established in this and other countries. B. died at Lyon in 1799. He was a voluminous writer on the diseases incident to quadrupeds, on the methods of treatment, and similar subjects. His best-known work is *Traité de la Conformation extérieure du Cheval, de sa Beauté et de ses Défauts* (Par. 1776), which has been translated into several languages.

Bourgeoisie, a French term, from *bourgeois*, a dweller in a *bourg*, or burgh, now applied to the middle trading class, as distinguished from the aristocracy and operative class. *Bourgeois* is to be carefully differentiated from *citoyen*, which is applicable to all persons possessing the rights of citizenship, irrespective of their rank; in short, the former has a *social* and the latter a *political* signification.

Bourges, the capital of the department of Cher, France, situated at the junction of the Auron and the Yvette, 123 miles S. of Paris. This ancient and famous city occupies a large area, and is rich both in natural and artificial beauties. Its trade, however, is not important, consisting chiefly in a slight export of grain, hemp, skins, and timber. There are also some manufactures of cloth, some tanneries, and more recently a foundry and an arsenal. Of its buildings, the most notable are the cathedral (13th c.) and the town-hall, a striking edifice of the 15th c., the outside of whose walls is covered with Gothic carvings of a high order.

B. is the ancient *Avaricum*, in the country of the *Bituriges*, and was taken (52 B.C.) by Cæsar, who described it as almost the finest city in Gallia, with a strong natural position. Under Augustus it became the fortified capital of the Roman province of Aquitania, was called *Biturica* (of which its present name is a corruption), and in the middle ages was the chief town of the duchy of Berry. It was the birthplace of Louis XI. In 1438 the Pragmatical Sanction, which asserted the right of the Gallican Church to choose its own bishops, was confirmed by Synod at B. The town is rich in historical monuments both of Roman and mediæval times. Pop. (1872) 22,654.

Bourignon, Antoinette de, born at Lille, 13th January 1616, was a religious mystic, who held the opinion that the Bible was not a sufficient source of faith, but needed to be supplemented by special revelation. At Amsterdam she abjured Catholicism, and printed there her works at a private press. As a proselytiser she was very successful. After occupying the position of the head of an hospital first at Lille and then in E. Friesland, she died at Franeker, 30th October 1680. B. was accused of grave trickeries, and of a piety too interested to be genuine. Her works, collected by Poiret, and accompanied by a biography, were printed in 21 vols. at Amsterdam 1679-84; 2d ed. 1717.

Bourmont, Louis Auguste Victor, Comte de Ghaïsne de, was born at Château de B. (Maine-et-Loire), September 2, 1773, and was made an officer of the Guards when sixteen years of age. On the outburst of the Revolution he joined the Prince of Condé, and served with energy and spirit in the war of La Vendée, but subsequently he went over to Napoleon, who made him a general of division. On the first Restoration (1814), he returned to the Bourbon cause, but on Napoleon's reappearance again changed sides, and received the command of a division of the army in Flanders. Once more he deserted Napoleon, on the eve of the battle of Ligny, and again finally adopted the royal cause. After the second Restoration he was made commander of a division of Royal Guards (1815), a peer of France, and leader of the army in Spain on the withdrawal of the Duc d'Angoulême (1823), and Minister of War (1829). He was commander-in-chief of the army sent against Algiers, for the capture of which place he was made a marshal of France, July 22, 1830. The July Revolution having meantime broken out, B. refused allegiance to Louis Philippe, and had to leave the country. In 1833 he assisted Dom Miguel in his abortive attempt to seize the Portuguese crown, after which he retired to Rome, but returned to France on the peace of 1840. He died at the family château of B., October 27, 1846. See Merson's *Notice Biographique sur le Maréchal de B.* (Nantes, 1846).

Bourne, Hugh. See PRIMITIVE METHODISTS.

Bourne, Vincent, well known for the exquisite grace of his Latin poetry, was born at Westminster in or about 1696, and educated at Westminster School and Trinity College, Cambridge. He was chosen a Fellow of Trinity College, Cambridge, in 1720, and was for several years an usher in Westminster School. B. died 2d December 1747. Some of his poems appeared as early as 1721 (*Carmina Comitalia Cantabrigiensia*), but the first collected edition was published in 1739, under the title *Pœmata Latine partim reddita, partim scripta*, a ninth edition of which was published by Pickering in 1840. The volume contains Latin versions of Addison's hymns, of several old English ballads, and of many other and inferior compositions. These versions display not only B.'s wonderful power over the Latin tongue, but the remarkable tenderness and beauty of his genius. Cowper preferred him to Tibullus, Propertius, and all other Latin poets, except Ovid, and thought him not at all inferior to him. 'Well fare,' says Charles Lamb, 'the soul of unfastidious V. B., most classical, and, at the same time, most English of the Latinists!'

Bournouse, or **Burnus** (Arab.), a white mantle with hood, much worn by the Arabs of Algeria and Morocco, by the Bedouins in N. Africa and Arabia, and occasionally seen in Spain and France.

Bourienne, Louis Antoine Fauvelet de, a well-known French author, was born at Sens, 9th July 1769, and studied along with Napoleon at the military school of Brienne, where the two formed an intimate friendship. B. first entered on a public career after the treaty of Campo Formio (1797), when he became Bonaparte's private secretary. After the Egyptian campaign he was made a Councillor of State, but lost his office and the confidence of Napoleon on the fraudulent bankruptcy of 'Maison Coulon.' He afterwards resided as *chargé d'affaires* at Hamburg, and embezzled large sums of public money, which was discovered. On the Restoration of 1814 he joined himself to Talleyrand, and received a post in the administration. Excepted by Napoleon from his Amnesty of Lyons, B. retired with Louis XVIII. to the Netherlands. He finally became a Minister of State, was in the *Chambre Introuvable*, and sat as a deputy for Yonne, until he had to run from his creditors. His reason then gave way, and he died in a *maison de santé*, 7th February 1834. His *Mémoires* concerning Napoleon, of the Directory, Consulate, Empire, and Restoration, in 10 vols., were published in 1829-31. They are detailed, but inaccurate.

Boussa, a town and district of Sudan, Central Africa. The town is naturally strong, being situated on a rocky island in the Niger, about 300 miles above the confluence of this river with the Chadda. Pop. estimated at from 10,000 to 18,000.

Boussingault, Jean Baptiste Joseph Dieudonné, an eminent chemist, was born at Paris 2d February 1802. After

being educated at the mining school of St Etienne, he went to S. America, where he fought under Bolivar. On returning to France, he was chosen Professor of Chemistry at Lyon, and afterwards Professor of Agriculture at the *Conservatoire* of Arts and Measures, Paris. He was elected to the Constituent Assembly in 1848, and made Commander of the Legion of Honour in 1857. The results of his scientific inquiries are contained in his *Economie Rurale* (2 vols. Par. 1844; 2d ed. 1849); English transl. by Law (Lond. 1845); and his *Mémoires de Chimie Agricole et de Physiologie* (Par. 1854).

Boussole's Strait, named after one of the vessels of La Perouse, passes through the Kurile Islands, and unites the Sea of Okhotsk with the Pacific Ocean.

Boustrophædon (Gr. *bous*, an ox, and *strephe*, I turn: literally, turning like an ox in the plough) is the term used to describe the early Greek manner of writing alternately from right to left, and from left to right. The laws of Solon were so written.

Bou'terwek, Friedrich, a writer on philosophy and poetry, was born 15th April 1765, at Oker, near Goslar, N. Germany. After studying jurisprudence and essaying poetry, he devoted himself to philosophy and the history of literature. He was made Professor of Philosophy at Göttingen in 1802, and died 9th August 1828. His chief work is his *Geschichte der Neuern Poesie und Redsamkeit* (12 vols. Gött. 1801-19), a work which, though of unequal merit, is yet a creditable monument of intellectual industry and independent judgment. In philosophy he was an adherent first of Kant and finally of Jacobi, and wrote treatises on the subject which are not remembered.

Bouts-Rimés (Fr. *rhymed ends*—of lines) is the name given to a particular sort of verse-making, which consists in fitting lines to appointed rhyming terminations. The diversion is said to have originated in a mishap which befell a French poetaster called Dulot. This man lived by writing sonnets for the courtiers of Louis XIV.; and it happened once that his MSS. were stolen. He bewailed his fate in having lost no fewer than 300 sonnets. On inquiry, it was found that these were *blank* sonnets, having only the rhymed endings. Hence originated the fashion, which appeared later in England. Horace Walpole relates how he had to fill up the rhymes *brook, I, crook, why*; which he did in this stanza—

'I sit with my toes in a brook, ●
And if any one asks me for why,
I gives 'em a tap with my crook,
And, 'tis sentiment makes me, say I.'

Bouvar'dia, a genus of plants of the natural order *Cinchonaceæ* (q. v.), natives of Mexico, one of which, *B. triphylla*, is commonly cultivated in flower-borders of our gardens. Its handsome red flowers are produced from June to November; but it ought to be placed in a greenhouse, frame, or dry cellar, to protect it from the winter frosts. *B. flava* (yellow flowers) and *B. longiflora* (white flowers) are also cultivated.

Bou'vet, Joachim, a French missionary, was born at Mans about 1662, and was sent by Louis XIV. on a scientific mission to China (a scheme favoured by Colbert, and, after his death, carried on by Louvois). On March 3, 1685, B. embarked at Brest, with five Jesuit fathers, and landed in China, 23d July 1687. Two of the fathers, detained in Pekin by the Emperor as teachers of mathematics, directed the building of the church and residence of the Jesuits in the capital. B. returned to France in 1697, bringing with him from the Emperor of China 49 Chinese volumes as a present to the King of France. Accompanied by ten new missionaries he again set out for China, which he reached in 1699. He died at Pekin, June 28, 1732, after having laboured long on a map of the empire. B.'s best-known work is his *Etat présent de la Chine* (fol. Par. 1697), some contributions to P. Duhalde's *Description de la Chine*, and a *Chinese Dictionary*, preserved in MS. in the Library of Mans.

Bouvines, a small place in French Flanders, to the S.E. of Lille, noted for two battles, the first fought 27th July 1214, between the Emperor Otto I. and Philippe Auguste, in which the latter was victorious; and the second, 18th May 1794, when

the Austrians, under Kliasky, were defeated by the French Republican Army of the North.

Bovey Coal, the lignite or wood-coal found at Bovey Tracey, Devonshire. It has a disagreeable odour, and is of little use except as fuel for burning pottery, and for brick and tile making.

Bo'vidæ, the family of *Ruminant* mammalia, which includes the various genera of *Oxen* and their allies. The animals of this group are generally of large size and heavy conformation. As in other members of the *Cavicornia* (or 'hollow-horned' Ruminantia), the horns are hollow, and consist each of a process of the frontal bone, or *horn-core*, covered by a horny sheath. These horns are generally borne by both sexes, and are not shed annually as in the Cervidæ or deer. In the B. the horns are usually turned outwards in a crescentic shape. The head terminates in a wide muzzle. The legs are strongly made. The skin of the neck is loose and hanging, and forms a large dependent fold, known as the *dewlap*. The tail is tufted. There are six incisors, two canines, and twelve molars in the lower jaw, and only twelve molars in the upper jaw; the place of the absent upper incisors and canines being taken by a callous or hardened pad of the gum. The females possess four teats. The B. occur in Europe, Asia, Africa, and N. America, and are represented as fossils only in the Pliocene and Pleistocene formations; the chief extinct forms being the Urus or wild bull (*Bos primigenius*), the *Bos antiquus*, the *B. longifrons*, together with the still existent bison or auroch (*B. bison*). See also ARNÉE, BANTENG, BISON, BUFFALO, OX, YAK, &c., &c.

Bovino (anc. *Velinum*), a fortified town in the province of Foggia, S. Italy, 20 miles S.S.W. of Foggia, and close upon the railway, that here crosses the country. It is a bishop's see, and has a cathedral. The valley of B. has long been a favourite haunt of brigands. Pop. 6000.

Bow, a term used generally for the front part of a ship. 'On the port,' or 'on the starboard' B., are phrases used in reference to objects seen within about 45° of the vessel's course to the left and right respectively.

Bow and Arrow, the most ancient weapons of offence and of the chase used by the human family, and among all uncivilised tribes the most generally employed. Arrow-heads of flint, rudely chipped, are the earliest remains found indicating the beginnings of human life on the globe, and something of the development of the race can be traced in the improved form and finish of flint arrow-heads. The remains of bows have also been found in large numbers in the deposits of the ancient Swiss lake-dwellings. The bow with poisoned arrows is to this day the favourite weapon among savages everywhere. See ARCHERY.

Bowditch, Nathaniel, LL.D., F.R.S., an eminent American mathematician and astronomer, and President of the American Academy, was born at Salem, Massachusetts, March 26, 1773, and died at Boston, March 16, 1838. His two principal works are *The American Practical Navigator* (1802), and an excellent translation of La Place's *Mécanique Céleste* (4 vols. Bost. 1829-38).

Bowdich, Thomas Edward, African traveller, was born at Bristol, June 1790, where he was educated, and passed some time in his father's counting-house. In 1814 he visited Cape Coast Castle, of which his uncle, Mr Hope Smith, was governor, and in 1816 was placed at the head of an embassy to the Ashantees, of which he published an interesting account (Lond. 1819). He afterwards resided in Paris, and produced numerous original works on Africa, and a translation of Mollien's *Sources of the Senegal and Gambia* (1820). In 1822, accompanied by his wife, he sailed from Lisbon for Africa, intent on wide explorations, but on reaching the river Gambia he had an attack of fever and died, January 10, 1824. His wife prepared from his notes *Excursions in the Island of Madeira, by the late T. E. B., with a Narrative of his Last Voyage, Remarks on Cape Verd Islands, and a Description of the English Settlements on the Gambia* (1825).

Bow'er (Old Eng. *būr*, and still so pronounced in Lowland Scotch, *bour*; perhaps connected with the Gr. *burion*, a house), originally meant a dwelling, either the whole house or a single

chamber, but later on was restricted in its application to the private apartment of ladies in a feudal castle. In this sense it is often contrasted with *hall*, where the feudal retainers assembled for food or mirth; *v.g.*—

'What never yet was heard in tale or song
From old or modern bard in *hall* or *bower*.'

Copius (lines 44, 45).

The lady's attendants were called her 'B.-maidens.' The ballad poetry of Scotland abounds with examples of the use of the word.

Bowerbankia, a genus of Molluscoid animals belonging to the class *Polyzoa* or *Bryozoa*, and to the order *Infundibulata* or *Gymnolamata* of that class. In this order the tentacles are arranged in a circular form, and the mouth is not guarded by a valvular process or *epistome*. *B.* is included in the sub-order *Ctenostomata*, and is common around the British coasts, growing attached to sea-weeds, stones, &c. The tufts or colonies of this form (for like all *Polyzoa*, *B.* is a compound animal) may attain a height of 1 or 1½ inches, and may be matted and creeping, or erect and of irregularly-branched shape. The cells, each of which contains a little zooid or animal, are of tubular form, and are thickly clustered together. Each little animal of the colony possesses from 8 to 10 tentacles, which are richly ciliated, and can be withdrawn into, or protruded from, the cell. The mouth opens in the central aspect, and a gullet, strong gizzard, stomach, and intestine belong to each animal. Certain cellular bodies are supposed to represent a liver. The tentacles bring particles of food to the mouth. No heart exists, but a circulation of fluid takes place in each cell. The nervous system is represented by a single nervous mass or ganglion placed near the mouth. Reproduction takes place by means of eggs, but the colony itself increases indefinitely by gemmation or budding. Complicated muscles for the retraction and protrusion of the tentacles exist. *B. imbricata*, and *B. densa* are familiar species.

Bower-Bird, the popular name of certain interesting Australian birds belonging to the Corvine family *Sturnida* (see **STARLING**), and so named on account of their constructing remarkable erections resembling bowers. These consist of a platform of twigs woven together, with other twigs fastened to it at the bottom, and curving upwards so as to meet at the top. These bowers are decorated with any bright-coloured or white objects the birds can procure, such as parrots' feathers, snail-shells, bones, coloured rags, &c. The aborigines are in the habit of looking in the bowers for any light and showy things they may miss from their encampments. The bowers are not used as nests, but as playing places, the birds chasing each other through and round them, often for hours at a time. The adult male *Satin B.-B.* (*Ptilonorhynchus holosericeus*) is of a deep purple hue, with glossy plumage resembling satin. The female and young male birds are of an olive-green colour. The *Spotted B.-B.* (*Chlamydera maculata*) makes larger bowers than the *Satin B.*, they frequently being a yard long. It is of a rich brown colour, with buff spots, and has a collar or cloak of long pink feathers on the neck, whence its scientific designation. These two species are natives of New South Wales. A larger species, the *Great B.-B.* (*Chlamydera nuchalis*), is found in N.W. Australia. The *B.* are partially insectivorous.

Bowie-Knife, a dangerous, sharp-pointed weapon, from 10 to 15 inches long, and a inches broad, named after its contriver, Colonel James Bowie, of the Southern States of America. It was long a favourite instrument with rowdies for settling their disputes, but its use is gradually being abandoned except by professed ruffians.

Bowing towards the Altar was no doubt originally an accommodation to Paganism, like so many more of the practices introduced into the early Christian Church. The pagans, whose religion was all more or less directly a worship of nature, always worshipped towards the rising sun. It was to meet the prejudice of converts; therefore, that the altar was placed in the E. end of Christian churches. But in modern times the practice of bowing towards it is connected with the doctrine regarding the presence of Christ in the Eucharist. See Bingham's *Ecclesiastical Antiquities*.

Bow Island, the largest coral island in the Low Archipelago, S. Pacific, accessible only in the N. through a small opening in

the reef, but affording a safe anchorage inside the barrier reef. This name was given by Cook, who visited the island in 1769, a year after Bougainville, by whom it was called *La Harpe*. The native name is *Hao*. *B. I.* is scantily peopled by a depraved race, engaged mostly in pearl-fishing.

Bowles, Rev. William Lisle, was born at King's Sutton, Northamptonshire, September 24, 1762, and educated at Winchester School and Trinity College, Oxford. His *Sonnets*, published in 1789, completely liberated from the artificial and conventional spirit of the 18th c., had a marked and merited success, and went far to inaugurate a new era in English verse. He may be regarded as the forerunner of the 'Wordsworthian' school, and was particularly admired by its chiefs. Coleridge, in a sonnet says:—

'No common praise, dear bard, to thee, I owe.'

After a quiet life as rector of Bremhill, in Wilts, *B.* died at Salisbury, 7th April 1850. He was a true poet of nature, and though not a classic, yet in virtue of his influence has a secure place in literature. His controversy with Byron and Campbell as to the poetry of Pope, whose works he edited, is well known. *B.* supported natural imagery in poetry, as against artificial, and is credited with victory by Hazlitt and other critics. Among his larger works are *The Spirit of Discovery, or Conquest of Ocean* (1805), and *The Missionary of the Andes* (1815). A new edition of his poems was published at Edinburgh in 1855.

Bowles, Samuel, a distinguished American journalist, was born at Springfield, Massachusetts, U.S., February 9, 1826, and since 1844 has been sole editor of the *Springfield Republican*, founded by his father. Under his management the paper has become one of the foremost journals in the country, and is noted for its extensive news, its literary taste, and its intelligent views of public affairs. In recent years it has laboured to free the press from the bias of political party. *B.* is author of *Across the Continent* (1865), *Our New West* (1867), and *The Switzerland of America* (1869).

Bowline, in nautical language, is a rope from near the middle of the weather edge, or leech, of a sail, to keep the leech firm. * The wind thus gets at the sail's after-side.

Bowls, Game of, one of the most simple, healthful, and popular recreations open to the community. The date of its origin is not known, but it has been traced by Strutt as far back as the 13th c. We may therefore say that, in some mode or another, it has been played in England for 600 years. After the middle of the 15th c., bowling became a common pastime in London and its environs. But we learn from Stow in his *Survey of London*, that the game was played in a roofed-in bowling-alley, as is still the prevailing form in England. Shakespeare repeatedly refers to it (*Twelfth Night*, *Shrew*, *Coriolanus*, &c.). Often attached to a tavern, the bowling-alley gradually degenerated till it became a haunt of the idle and the dissolute, and complaints were rife about its pernicious influence on the habits of tradesmen; and it is more than doubtful whether it can ever become a scene of pure and wholesome amusement. But within the present century, and particularly in Scotland, the game, played in the open air, and on a well-turfed green or lawn, as distinguished from the bowling-alley, has come to occupy a high position among popular recreations. At present the bowling-green may almost be considered as an 'institution' of the country. It is to be found in nearly every town N. of the Tweed, and is often laid out with exquisite beauty. It is gradually finding its way across the border, like another grand Scottish game, golf. Edinburgh has now a considerable number of bowling clubs, with many excellent greens, and not a few skilful players, but the W. of Scotland, especially Glasgow and Ayrshire, are the strongholds of bowling; and there, as also in the shires of Kirkcudbright and Dumfries, are to be found the finest greens, the greatest number of players, and the most admirable play.

A bowling-green should be laid with very fine turf, and be as smooth and as perfectly level as possible. It may vary in length from 30 to 35 yards. A width of 25 yards admits of three separate games being played at the same time, but the larger greens have sufficient width to accommodate from eight to ten rinks. The *B.* are generally made of *Agnum vicia*, a dense, heavy wood, are about 16 inches in circumference, and more or less oval in

shape. They have a bias given them by their inner side being made more flat than the outer, which causes the bowl to make a considerable bend or circuit in its course as it slows in approaching its destination. This bias, sometimes very considerable, enables a player to send his bowl round others which seem as if they must obstruct its passage, and the delicate calculation of the bias is an important element in the skill and beauty of the play. The surface of the bowl being very smooth, it runs easily along the green.

The game may be played by two or more persons, forming two opposing sides; eight players, four on each side, making a full party, or *rink*, as it is termed. A small wooden ball, painted white, perfectly spherical, and about three inches diameter, called the *jack*, is thrown more than half or nearly the whole length of the green. Each member of the rink plays two B., and the bowl or B. lying nearest the jack when all have been played are reckoned *shots* to that side by which they are played, the game consisting of 7, 9, 13, or 21 shots, as may be agreed on, the two last being the most common. One bowl is played by each side alternately, and when all have been played, and the number of shots to the winning side ascertained, the jack is thrown again, and a new *end* commenced as before; and so on till either of the opposing parties has gained the required number of shots, and thus become the winners. In the attainment of this object, every bowl which is played affords the opportunity of displaying a great amount of skill; the player at one time aiming to have his bowl close to the jack, and at another to land it at such a spot as may obstruct his opponent's play, or where it is likely to count a shot, should the position of the jack, which is movable, be changed by any future bowl striking it; and the player himself may be required, with his bowl, to move the jack a few inches or feet, as directed by his partners, to where one or more of their previously played B. may be lying; or, if the situation be desperate, to upset all previous calculations by a *run*; that is, by discharging his bowl with such force and precision that the jack and the B. around it may be scattered in all directions, and chance determine the issue. See Mitchell's *Manual of Bowl-Playing* (Glasg. 1864).

Bowring, Sir John, an English politician and scholar, was born at Exeter, 17th October 1792. Early in life he attained a high reputation as a linguist and a translator of the more ancient and the more modern popular poems of most of the countries of Europe. B. was the friend and subsequently the executor of Jeremy Bentham, a contributor from the first to, and for five years editor of, the *Westminster Review*. He sat in Parliament for the Kilmarnock Burghs from 1835 to 1837, and for Bolton from 1841 to 1849, distinguishing himself as an advocate of free trade. He was sent on various commissions by the British Government to inquire into the commercial relations of European states. In 1849 he was made British consul at Hong-Kong, and for his services in this capacity the honour of knighthood was conferred upon him. He was subsequently made governor of Hong-Kong, and on an insult being offered to the British flag (1856), B. caused certain Chinese forts to be fired on—a procedure which occasioned a ministerial crisis at home. In 1855 he concluded a commercial treaty with Siam, about which country he wrote a fine work, *The Kingdom and People of Siam*, and in 1861 reported on the commercial relations between Britain and Italy. He died November 23, 1872. B.'s works are numerous and varied, the chief, perhaps, being his edition, in 23 vols., of the works of his political master, Bentham, accompanied by a biography (Lond. 1843). See *Autobiographical Recollections of Sir J. B.* With a brief memoir, by L. B. Bowring (Lond. 1877). —**Edgar Alfred B.**, son of the preceding, born 1826, educated at University College, London, and successively private secretary to the Earl of Clarendon, Earl Granville, and Lord Stanley of Alderney, has won a fair place in literature as a translator of Schiller, Goethe, and Heine. He was returned to Parliament for Exeter in 1868, but lost his seat at the general election in 1874.

Bow'sprit, of a ship, is a large boom projecting over the stem, and carrying the forward sail. It is generally inclined at a small angle to the horizontal.

Bowstring Girder, a type of girder in which the upper member is arched, and the lower one horizontal. If the arch be (as it is in practice approximately) an arc of a parabola, and the load on the girder be uniformly distributed, the stress in the

lower member is a uniform tension throughout its whole length, and the horizontal component of the compressive stress in the upper boom is also the same at every point. Inverted bowstring girders are sometimes used, and other modifications of the same type.

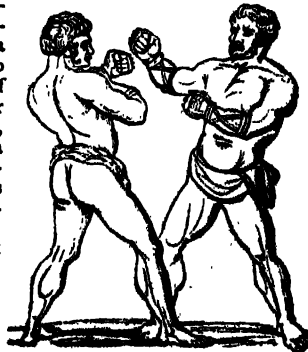
Bowstring Hemp, or **African Hemp**, the fibres of *Sesuviera Zeylanica*, and other species of the genus, belonging to the natural order *Liliaceae* (q. v.).

Bowyer, William, an English typographer, born in Whitefriars, London, 19th December 1699, belonged to a family of printers. He was educated at Cambridge, and appointed printer of the resolutions of the House of Commons in 1729, an office which he held till his death, 18th November 1777. Among his more noteworthy publications are his *Works of Selden* (3 vols. 1726); *Novum Testamentum Græcum* (2 vols. 1763); and an edition of the *Lexicon* of Schrevelius, with considerable additions. His miscellaneous tracts were collected and published by his successor, Mr Nichols, who also wrote B.'s Life.

Box (*Buxus*), a genus of plants of the natural order *Euphorbiaceae* (*Spurgeworts*), with evergreen foliage, generally shrubs or small trees. The common B. (*B. sempervirens*), is a native of the S. of Europe and some parts of Asia, but is now extensively cultivated as an edging for garden plots. It is said to be indigenous at Boxhill in Surrey. In warm countries it will often attain a height of from 24 to 30 feet, though it rarely reaches more than half that height in this country. The variety cultivated for edging is known as the *Dwarf B.* The leaves have a peculiar and rather disagreeable smell, and bitter taste. Taken internally, they cause purging, and externally a decoction of them promotes the growth of hair. The firm, smooth, yellowish wood is greatly valued by the cabinet-maker and wood-engraver, and for the manufacture of various musical and mathematical instruments. It is sudorific in its properties, if taken internally in the form of scrapings. Spain, Portugal, Circassia, and Georgia are the countries from which we derive most of our boxwood. *B. Balanica*, the Turkey or Minorca B., also yields a fine timber valued for wood-engraving. Between two and three thousand tons of B. are annually imported into Britain. The common B. is the badge of the Clan McIntosh, while the M'Phersons have adopted the variegated variety as theirs.

Box-Days. In the Court of Session in Scotland, B.-D. are two days appointed by the judges in each spring and autumn vacation, and one day in the Christmas recess, for lodging papers ordered by the court towards the close of the preceding session. The first box-day is also the day on which judgments or 'interlocutors' of the Lords Ordinary, pronounced within twenty-one days of the close of the session, become final, unless a *Reclaiming Note* (q. v.) be 'boxed' on the first day. In the inferior courts, the sheriff must, under statute, before the end of each session, appoint at least one court-day during each vacation for despatch of all ordinary civil business, including the calling of new cases, and lodging, during the vacation, of papers required.

Boxing, *i.e.*, fighting with the fists, has for a very long time been a favourite practice in England of men and boys. With the latter it has been in especial favour at school, as a summary method of deciding a quarrel. It may seem to many that this practice of boys so determining their quarrels is a brutal one, which, as such, ought to be put a stop to by penalties of necessary severity. The advocates of the system, again, maintain that the training required in learning B. is good for the physical development, and that the amount of pain which one boy can inflict on another in a fair fight is in general no more than every boy is able to bear, and that it cannot do him any ultimate harm; further, that the fighting is a good moral as well as a good physical training, because the



Ancient Boxers.

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opinion of the school demands that the contest be conducted without loss of temper on either side, and with the strictest regard to the rules of fair play on both. There can, indeed, be no doubt that B. has hitherto formed an essential feature of those English playgrounds on which, according to the Duke of Wellington, the battle of Waterloo was won. As the foreign policy of England does not, however, seem likely to lead to many battles for the future, perhaps the physical training which led to the great victories of former times may now be regarded as superfluous. By the law of England prize-fighting is illegal, and if either of the combatants be killed, the killing is felony or manslaughter. But if under the ban of the law, there can be no doubt that a B.-match between two noteworthy pugilists still possesses almost irresistible attractions even for men of the upper classes in England. In our own time we have seen the extraordinary spectacle of both Houses of Parliament nearly emptied in order that members might behold an infraction of the law. This took place, 17th April 1860, at Farnborough, on the occasion of the famous B.-match between Tom Sayers, the champion of England, and John Heenan, 'the Benicia Boy,' an American. The prize was a stake of £200 on each side, and the 'champion belt.' The battle at the end of two hours was put a stop to by the police, each combatant claiming the victory. In the House of Commons the Home Secretary announced that the spectators as well as the principals had broken the law, and were consequently liable in penalties. No legal proceedings, however, followed this announcement.

Boxing-Day, the day on which Christmas-boxes are given to servants, messengers, &c. These presents are looked for the day after Christmas.

Boxing the Com'pass, i.e., repeating the thirty-two points of the compass in order. The origin of the phrase is not known.

Box'-Sextant, a modification of the nautical sextant, used to measure angles in surveying. The whole instrument is enclosed in a small cylindrical box, a few inches in diameter, so as to be very portable.

Box'tel, a Dutch town, province of N. Brabant, at the confluence of the Dommel and Beerze, 7 miles S. of Bois-le-Duc. It has eighteen linen factories, employing 260 weavers, and is noted for its beautiful diapers. Pop. (1873) 4225. B. was the scene of the defeat of the Anglo-Dutch army under the Duke of York by the French in 1794.

Box'-Thorn (*Lycium*), a genus of plants of the natural order *Solanaceæ*, of which several (thorny shrubs) are natives of the S. of Europe, and some are almost trees. *L. Europæum* and *L. fuchsoides* are among the cultivated species, the latter being used in its native country (the Andes of Quito) as a hedge plant—a purpose to which the former species is also sometimes applied in Spain and Tuscany.

Boya'ca, or **Bojaca**, a town and state of Colombia, S. America, situated 12 miles S. of Tunja, the capital of the state. Near B. Bolívar defeated the Spaniards, and secured the independence of Colombia in 1819. Area of state, 17,000 sq. miles; pop. (1870) 482,874.

Boy'au, in the nomenclature of siege-work, is a winding trench, which forms a communication between the different armed trenches. Its object is to prevent them from being fired upon in flank.

Boy-Bishop (*Episcopus Puerorum*), was elected on St Nicholas's Day (December 6), and his mimic jurisdiction lasted till St Innocent's Day (December 28). The ceremonies of the election were copied from those performed at the regular episcopal consecration. The B.-B. was usually selected from the cathedral choristers, and had a juvenile chapter who assisted him in his episcopal functions. The office was accompanied by substantial benefits. If a prebend became vacant during the period of his episcopacy, the B.-B. had the power of filling it. A proclamation of Henry VIII. prohibiting the election of the B.-B. was recalled in the reign of Mary. The custom has now dropped out of use. See Dr Rimbaud's *Account of the B.-B. of Salisbury*, published by the Camden Society (Lond. 1875).

Boyd, Robert, of Trochrig, an eminent Scotch divine, was the son of James B., twelfth Archbishop of Glasgow, and

was born in that city in 1598. Educated in Edinburgh and France, he commenced teaching in the latter country at Tours, was ordained pastor at Verteuil in 1604, professor at Saumur in 1606, and was afterwards called by King James to the Principalship of Glasgow University, where he taught Hebrew, Syriac, and theology, and also preached every Sunday in Govan. He died 5th January 1627. Of B.'s works, the least unknown is his *Praelectiones in Epistolam ad Ephesios*. He was a fine Latin scholar of the old type, and had a genius for Latin verse which he did not sufficiently cultivate.

Boyd, Zachary, a Scottish divine, belonging to the family of the Boyds of Pinkell in Carrick, and cousin of Robert B. of Trochrig, was born before 1590, and educated first at Kilmarnock, afterwards at Glasgow, and at Saumur, France, where he became a regent or teacher in 1611. In 1621 he returned to Scotland, was appointed minister of the Barony parish, Glasgow, in 1623, where he died in 1653 or 1654. B. was thrice chosen rector of the university of that city, which he enriched with a considerable collection of books, and, for the period, a handsome legacy. *The Last Battell of the Soule in Death* (2 vols. Edinb. 1629), reprinted at Glasgow in 1831, and his *Psalmes of David in Meter* (Glasg. 1646), are the works by which he is chiefly known. His *Zion's Flowers*, a MS. collection of poems on subjects in scripture history, has from its quaintness acquired an exceptional celebrity among literary antiquaries. The soliloquy of Jonah within the whale's belly has often been quoted. Two lines will suffice as an example—

'What house is this, where's neither coal nor candle,
Where I nothing but guts of fishes handle?'

In spite of this grotesquerie there is some real poetry and much beautiful devotion in *Zion's Flowers*.

Boydell, John, born at Stanton, Shropshire, January 19, 1719, was apprenticed in London to Toms, the engraver, for seven years, and later became a printseller, and one of the most beneficent patrons of English art. He is best known as the proprietor of the 'Shakespeare Gallery,' a splendid collection of paintings by Opie, Reynolds, Northcote, and West, which, at a later period, were beautifully engraved, and published as illustrations of a magnificent edition of Shakespeare from Bulmer's press (4 vols. fol. 1792-1801). B. was made Lord Mayor of London in 1790, and the Guildhall still contains several fine paintings which he presented to the Corporation. At the time of the French Revolution his business became embarrassed, and in 1804 he disposed by lottery of the 'Gallery' and all his pictures and plates. He died December 11, 1804.

Boyer, Alexis, Baron de, a French surgeon, born at Uzerche, Limousin, 30th March 1757. In 1804 he became First Surgeon to Napoleon I., whom he accompanied on his campaigns; and after the Restoration was appointed Professor of Surgery in the Paris University and First Surgeon at the Hôpital de la Charité. B. died November 25, 1833. His chief works are his *Traité d'Anatomie* (4 vols. 1797-99) and his *Traité des Maladies Chirurgicales* (8 vols. 1814-22). The *Nouvelle Biographie Générale* contains a full notice of his life and works by M. Malgaigne, from which one can see that his position was greater than his merits.

Boyer, Jean Pierre, a mulatto president of the republic of Hayti, was born at Port-au-Prince, February 28, 1776, and educated in France. On his return to the island in 1792 he joined the army, and distinguished himself in aiding Pétion to found an independent republic. He was subsequently raised to the rank of major-general, was vested with the command of the capital, Port-au-Prince, and on the death of Pétion (1820) was unanimously elected his successor. Under B. the republic, which now embraced the Spanish or eastern portion of the island, was recognised by the European powers, and was acknowledged by France on payment of an indemnity to the old planters of 150 millions of francs (£6,000,000). For an unwonted period the new rule was one of great tranquillity, but no effort was made to improve the lot of the negro, and in March 1843 a victorious rising took place. (See HAYTI.) B. fled on board an English man-of-war ship to Jamaica, where he continued to reside for some considerable time. He afterwards came to Europe, and died at Paris, July 9, 1850. Arrogant and tyrannous to his subordinates, B. was nevertheless a master of craft and courtesy.

Boyle (Ir. Gael. *Bacghill*, named after a famous Irish chieftain, ancestor of the O'Boyles), a town of Ireland, Roscommon county, on the B., 18 miles S.S.E. of Sligo. It is a station on the Dublin and Sligo Railway, and has a large trade in dairy and farm produce. Pop. (1871) 3161. Its annals, in Latin and English, which date from 420 to 1245, have been published. Near B. are the ruins of an abbey, built in the 12th c.

Boyle, Charles, third Earl of Orrery, born at Chelsen, 1676, educated at Oxford, and chiefly known for his edition of the *Epistles of Phalaris*, the work mainly of Atterbury, Friend, and others. It was published in 1695, extolled by Sir William Temple, and mercilessly exposed by Bentley in his celebrated *Disertation*. A controversy ensued, in which Bentley was completely victorious, showing that the Epistles were not written in the 6th c. B.C., but in the 2d c. A.D. B., who served for some time in the army, and was employed as an ambassador, was made an English peer, wrote some verses and one comedy, and died 28th August 1731. The name 'Orrery' was given in honour of B. to the instrument of this name by the inventor, Graham.

Boyle, Richard, first Earl of Cork, was the son of a Herefordshire gentleman, and was born at Canterbury, 3d October 1566. After completing his education at Cambridge, he joined the Middle Temple, but in 1588 went to Dublin to push his fortune. Seven years later he married a very wealthy lady, who, on her death in 1599, left him her whole estate. B. now began to invest extensively in the purchase of land. The envy or malice of other proprietors soon involved him in troubles, and he was even thrown into prison for a time in England, but at last obtained the ear of Elizabeth, who sent him back to Ireland with special marks of the royal favour. He obtained the confidence and friendship of Sir George Carew, Lord-President of Munster, who consulted him on all matters of political importance. In 1612 he was sworn a privy councillor of Ireland, in 1616 he was created Lord B., and in 1620 Earl of Cork. In 1629 he became Lord-Justice of Ireland, and in 1631 was made Lord High Treasurer of the kingdom. He displayed great vigour and courage on the outbreak of the Irish rebellion. B. died 15th September 1643.

Boyle, The Hon. Robert, seventh son and fourteenth child of Richard B., the first Earl of Cork, was born January 25, 1626, at Lismore, Waterford. After finishing his studies at Eton, he spent six years on the Continent, whence he returned in 1644, after his father's death. For the rest of his life he applied himself chiefly to science; and he was among the first members of that scientific association which, after the Restoration, received the name of the Royal Society. As a Director of the East India Company, he exerted himself greatly for the propagation of Christianity in the East. Another example of his religious tendencies is his bequest for the foundation of the 'B. Lectures' (q. v.). After a gradual decline, he died at London, December 30, 1692. B.'s works, among which may be mentioned *Medicina Hydrostatica*, *The Christian Virtuoso*, and *Experimenta et Observationes Physicae*, were published, together with his *Life and Correspondence*, by Dr Birch (5 vols. Lond. 1744).

Boyle Lectures, *Tha*, were founded by the Hon. R. Boyle (q. v.). The lecturer is to be appointed for a period not exceeding three years, and to deliver annually eight sermons, 'to prove the truth of the Christian religion against infidels, without descending to any controversies among Christians themselves; and to answer new difficulties, scruples, &c.' The first series was delivered by Richard Bentley (1691-92); and a collection of such as were preached between that time and 1732 was published in 1739. In 1802 the practice was begun of publishing them regularly.

Boyle's Fuming Liqueur, or *Volatile Liver of Sulphur*, is obtained by distilling a mixture of 1 part of sulphur, 2 of sal-ammoniac, and 2-3 of quicklime. It is a dark yellow liquid, possessing the disagreeable odour of rotten eggs. It consists of a mixture of different *sulphites of ammonium*.

Boyle's Law, also known as *Marriott's Law*, expresses that at constant temperature the volume of a gas is inversely proportional to the pressure. It was first proved experimentally by Robert Boyle (q. v.).

Boynes, a river in the E. of Ireland, rises in the Bog of Allen, Kildare, flows through King's county, Meath, and Louth,

and enters the Irish Sea four miles below Drogheda, after a course of 65 miles and a total fall of 336 feet. The Deel, Mattock, and Blackwater are its tributaries. Near Oldridge is an obelisk 150 feet high, marking the scene of the battle of the B., in which William III. defeated James II., July 1, 1690.

Boys' Ships. See SHIPS, TRAINING.

Bozza'ris or *Botzaris*, *Marcoos*, the hero of the Greek War of Independence, was born of a warlike family of Suliots, in the valley of Acheron (Janina), in 1788. In 1820 he issued from the Ionian Isles, the retreat of the expatriated Suliots (q. v.), at the head of 800 men, combined with Ali Pasha against the Sultan, and after the death of the former (1822) continued the war with unabated vigour. He was soon reinforced by Prince Mavrocordato with a disciplined force, but treachery led to the loss of the battle of Petta (July 16, 1822), after which the Greeks retired upon Mesolonghi. In the following summer B. anticipated the approach of the enemy, and by a brilliant night-attack, with only 1200 men, destroyed a Turco-Albanian army 4000 strong. But in this victory B. fell (August 20, 1823), leaving behind a name still extolled in many a Greek song.—**Kosta** or *Konstantinos B.*, brother of the former, also distinguished himself in the patriotic wars of Greece, was subsequently a general and senator, and died at Athens, November 13, 1853.—**Dimitri B.**, the only son of Marcoos, has been Minister of War under King Otto since June 22, 1859.

Bozz'olo, a town of N. Italy, province of Mantua, on the Oglio, 16 miles W. by S. of Mantua, and 14 miles S. of the railway between Mantua and Cremona. It has an annual fair and some silk-weaving, and was at one time a small independent republic. Pop. 5000.

Brà, a town of N. Italy, province of Cuneo, 25 miles N.E. by N. of Coni. It is an important railway junction, with metal foundries, silk and linen factories, and an active trade in cattle, wine, grain, fruit, &c. Pop. 12,500.

Brabançonne, the Belgian national song, first sung during the Revolution of 1830. It was composed by Jenneval, a young French actor, then engaged at the Brussels theatre, and set to music by Campenhout, afterwards Director of Music in the Chapel Royal. The refrain contains a pun on the title of *Orange* held by the royal house of Holland—

'La mitraille a brisé l'orange
Sur l'arbre de la liberté.'

Brabant' (Old Ger. *Brachbant*, 'the ploughed district'), formerly a powerful duchy, situated in the centre of the Low Countries, and now divided into (1) the Dutch province of North B., containing 1960 sq. miles, and (1873) 443,045 inhabitants; (2) the province of Antwerp, in Belgium, which contains 1004 sq. miles, and (1872) 497,017 inhabitants; and (3) South B., also in Belgium, with 1260 sq. miles, and a population (1872) of 887,905. The country is flat, but slopes gradually in a N.W. direction, and is well cultivated and fertile, being watered by the Maas and the Scheldt, with their many tributaries, and intersected by numerous canals. It has also flourishing industrial centres, as Brussels, Antwerp, Bois-le-Duc, the products chiefly consisting of linens, lace, cottons, and leather. In the N. the inhabitants are Dutch, and in the central part Flemish, while the S. district is the principal residence of the Walloons. Cæsar found B. occupied by a mixed German-Celtic race. In the 5th c. it came under the Franks, and on the division of the Frankish kingdom in the 6th c. it formed part of Austrasia. In the 9th c. it was united to Lothringen; in 890 to France; in the 10th c., through the German king Heinrich I., again to Lothringen, together with part of which it was joined to Germany in 959. The line of Dukes of Lower Lothringen died out in 1005, and B. was subsequently governed by several princes of the Ardennes; after 1076 by Godfrey of Bouillon. Heinrich V. bestowed B. on Godfrey of Bârtigen (born 1140), descended from the princes of Louvain and Brussels, who founded a dynasty lasting till 1355, and the title of Duke of B. was first taken by Heinrich I. in 1190. Later on, B. shared the fortunes of the Netherlands, but became part of Holland by the Treaty of Vienna, 1815. At the insurrection of 1830, however, South B. threw off the Dutch yoke, and united itself to Belgium.

Braccio Fortebracci, Count of Montano, an Italian condottiere, was born at Perugia in 1368. In 1408 he rendered valuable services to Ladislaus, King of Naples, which were subsequently ungenerously repaid by expulsion from Perugia, of which, however, B. gained the sovereignty in 1416. In 1417 B. obtained temporary possession of Rome, entered about 1420 the service of Joanna, Queen of Naples, who created him Prince of Capua, and died 5th June 1424, in consequence of wounds received three days before in a battle for the relief of Aquila, which he was then besieging. The followers of Sforza and of B. formed rival schools of warriors, known as the *Sforzeschi* and the *Bracceschi*, and their rivalry culminated in the most profound hatred. See Antonio Campano's *Vita di B.*

Brace, a carpenter's tool, used—along with borers of various shapes, called bits—to make holes in wood.

Bracelet, an ornamental ring or band worn upon the wrist or upper arm (Fr. *bras*; Lat. *brachium*). The fashion of wearing bracelets is one of very high antiquity, and is common to almost every nation; and though among modern civilised nations the B. is a form of female adornment, in bygone times, and still among savage tribes, it was used by both sexes alike. Chivalrous conduct on the part of Greek and Roman soldiers was acknowledged by the presentation of a B.; and among the Scandinavians and Saxons this ornament formed a suitable tribute of esteem. The *tumuli* of the ancient Britons have furnished numerous examples of bracelets composed of bone, ivory, bronze, and other metals; they have also been plentifully found in the peat bogs of Ireland. Previous to the Norman incursion into Britain, bracelets were worn by Saxons of both sexes, but after that event their use was almost entirely abandoned by men, and to some extent even by women. During the three centuries immediately thereafter, the B. was not much in favour as a personal ornament; but in the 16th c. the fashion among ladies of wearing short sleeves led again to its adoption, and since that time the B. has retained its popularity as an ornament of luxury. It assumes a great variety of forms, and is frequently made of the most costly materials, enriched with gems and precious stones.

Braces, in roofs, bridges, and other structures, are bars (which may be either *struts* or *ties*) used for stiffening the principal members. All the common forms of girders consist of an upper and lower member (or boom) connected by bracing, which in this case has to be strong enough to resist the shearing stress caused by the load.

Brache, a term of uncertain meaning, applied to a dog. It is supposed to have meant a bitch of the hound kind. If the word be from the Celtic *brac*, a spot, it might signify a spotted hound.

Brachial Artery, the main artery of the arm, is a continuation of the axillary artery (see *AXILLA*), commences at the lower border of the fold of the armpit, and about half an inch below the elbow divides into the radial and ulnar arteries. It lies on the inner border of the biceps muscle. At first it is on the inner side of the arm, and afterwards lies more in front. In the case of bleeding from the hand or forearm, and during operations below this vessel, the B. A. is easily compressed against the bone.

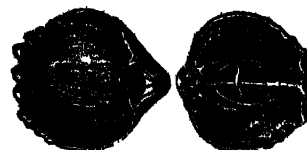
The B. A. gives off four named branches—(1) Superior profunda artery, which, along with the muscular spiral nerve, winds round the arm to the back; (2) the inferior profunda artery, which, along with the ulnar nerve, runs to the neighbourhood of the elbow; (3) the nutrient artery of the shaft of the humerus; and (4) the anastomotica magna, which meets with arteries of the forearm around the elbow-joint.

Brachialis Anticus is a broad muscle covering the front of the elbow-joint and lower half of the Humerus (q. v.). It arises from the middle of the humerus, and is inserted into the Ulna (q. v.). Its chief action is to flex the elbow-joint, which it does in conjunction with the biceps muscle. The B. A. helps also to protect the elbow-joint.

Brachiate, when opposite branches are decussate, i.e., one pair crosses over the pair below it in a cross-shaped manner.

Brachiopoda (Gr. 'arm-footed'), a class of *Mollusca* or Lower *Mollusca*, formerly denominated *Palliobranchiata* (or

'mantle-breathers'), under the erroneous impression that the Mantle (q. v.) which forms the shell was the chief agent in respiration or breathing. These forms possess *Bivalve* (q. v.) shells, which are placed dorsally and ventrally, the dorsal or upper valve being generally the smaller, and in many cases containing a series of limy loops (*carriage-spring apparatus*) for the support of the arms. These latter structures



Brachiopoda.

are two in number, one stretching away from each side of the mouth. They are characteristic of the brachiopods, each consisting of a prolongation of the mantle, furnished with *cirri* or stiff processes, and with *cilia*. Their functions are those of *breathing* and of drawing particles of food towards the mouth. The shell is opened and shut by means of special muscles. A heart and digestive system exist, and a single nervous mass or ganglion is developed. The B. are but sparsely represented in existing seas, but over 2000 fossil examples are known. The *Silurian* system of rocks is sometimes known as the '*Age of Brachiopods*,' from the abundance in them of these molluscs in a fossil state. All are marine. Living genera are *Terebratula*, *Crania*, *Discina*, *Lingula*, &c. Among fossil genera, *Producta*, *Spirifer*, &c., may be mentioned. These forms chiefly occur in a living state in Australian and adjacent seas. See also *BIVALVE SHELL*, *MOLLUSCA*, &c.

Brachyptera, or *Brevipennatæ* ('short wings'), the name given to a section or family of *Natatorial* or swimming birds, represented by penguins, auks, divers, guillemots, grebes, &c., in which the wings are short or rudimentary, and sometimes useless for flight (penguins); the tail short, and the legs placed far back on the body. The wings, when useless for flight, may still (as in auks, &c.) form very efficient aids in diving and swimming.

Brachyura ('short tailed'), a division of the *Decapodous* order of Crustacea, represented by the various kinds of crabs. These possess a rudimentary abdomen, which is tucked up beneath the broad body or *cephalothorax*, consisting of the united head and chest. The rudimentary abdomen is not provided with appendages, and is used, in the case of the female animals, to carry the ova or eggs. The B. generally undergo a metamorphosis—the common crab first appearing as a tailed form (*Zoea*), next as a *Megalopa*, and lastly as the perfect crab, with a rudimentary abdomen.

Brack'et, in classical and mediæval architecture, is an ornament in the shape of a console standing isolated on the face of a wall. Their use is to support a statue or bust. Recently brackets made of wood, and covered with leather ornamentally stamped, have come much in vogue. The name B. is also applied to a projecting gaspipe.

Bracklesham Beds, the name given in England to that part of the Eocene deposits which overlie the 'London Clays.' They are the equivalent of the *Calcaire Grasse* of the Continent, and are very fossiliferous. The best examples are found in the Isle of Wight and in Hampshire.

Bract. In many plants the flowers spring from the axils of leaves (floral leaves), differing in no appreciable degree from ordinary leaves. But in others the leaves from the axils of which the flowers rise have a regular gradation from ordinary leaves up to what are called *bracts*, these bracts being, however, veritable leaves, which, as they ascend the stem, change their form and coloration, until the uppermost not unfrequently assume the appearance of petals (Brown). In structure they also affect the character of leaves. Sometimes, as in *Salvia fulgens*, *Amarantus nobilis*, &c., the bracts attain great development, and in brilliancy exceed the flowers



Bracket, Melrose Abbey.

themselves. When the floral axis branches, secondary bracts or *bracteoles* are often seen at its ramifications.

Braddock, Edward, an unfortunate English general, who commanded against the French in America in 1755. On the 9th of July of that year, while in command of a force of 2000 British and colonial troops, he fell into an Indian ambush near Fort Duquesne (now Pittsburg, Pennsylvania), while he was attacked by the French in front. B. was mortally wounded, and died four days after the engagement; and half of his men perished, the remainder escaping under his aide-de-camp, Colonel Washington, afterwards the hero of the War of Independence.

Braddon, Mary Elizabeth, a popular novelist, daughter of Mr Henry B., a solicitor, himself addicted to light literature, was born in Soho Square, London, in 1837. At an early age, she began to contribute to magazines both in prose and verse, but it was not till 1862, when she published the novel *Lady Audley's Secret*, that she became famous. By this, and a host of fictions that have succeeded it, she has established the right to be considered the first of writers of 'sensation' novels, which depend mainly for their success upon startling situations and a skilfully evolved plot. In some of her later works, Miss B. has shown considerable power of humorously sketching character. She conducts a London magazine called *Belgravia*, contributes to the newspaper press, and in 1873 came before the public as a dramatist with the play of *Griselda*.

Bradford (Old Eng. *Brddanford*, 'broad ford'), a manufacturing town in the W. Riding of York, on a tributary of the Aire, 8 miles W. of Leeds, and 34 miles S.W. of York. It is a station on the Leeds, Bradford, and Halifax Junction Railway, by which it is brought into connection with the Great Northern, Lancashire, and Yorkshire, London and North-Western, and other lines. It is the chief seat and mart of the worsted manufacture in England; mixed fabrics of wool and silk, and wool and cotton, are extensively wrought, and there are also cotton and silk manufactures. The Saltaire Alpaca and Mohair Mills, erected on the Aire, three miles from B., by Sir Titus Salt, employ 4000 men, and form the most extensive manufacturing establishment of the kind in the kingdom. There are nearly 200 mills in B., and these employ 40,000 hands, a majority of whom are immigrants. In the vicinity there is much coal-mining and iron-smelting. Among the public buildings are St. George's Hall, the Exchange, with a clock-tower and spire 150 feet high, the County Court, the churches, new theatre and music hall (1875), new corporation markets (1874). The Thornton Viaduct at B. is a fine piece of masonry. The Wesleyans, Baptists, and Independents have here colleges. B. has several fine public parks. A statue to Sir Titus Salt was erected in 1874. B. returns two members to Parliament. Pop. (1877) 173,723. During the civil wars B. was stormed by the royal forces under the Earl of Newcastle.

Bradford Clay, a pale, greyish clay, enclosing bands of impure limestone, the middle member of the upper division of the W. of England Lower Oolites, corresponding in age with the limestones of the Great Oolite, and abounding in the peculiar fossil the *Apicrinile*, and in one or two species of *Terebratula*. Maximum thickness, 60 feet.

Bradford, Great, a town in Wiltshire, on the Avon, 6 miles E.S.E. of Bath. It is a station on the Great Western Railway. Pop. (1871) 4871, engaged to a considerable extent in the manufacture of broadcloth, for which the town has been noted for several centuries. The origin of the trade is said to be owing to the settlement of Flemish weavers here in the reign of Edward I. St Aldhelm, in the beginning of the 8th c., founded an abbey here. It is mentioned in the *Chronicle*, under 652, as the scene of a battle between Cenwulf, King of the West Saxons, and his kinsman Cuthred.

Bradford, William, second governor of Plymouth Colony, was born at Austerfield, Yorkshire, 1588. He had a good patrimony, and is one of the few early pilgrims who can be clearly shown to have had a gentle ancestry in England. B. came with the first colonists in the *Mayflower*, 1620, was the second governor of Plymouth Colony, New England, and died May 9, 1657. He is the author of a *History of the Colony*.

Bradley, Dr James, a distinguished English astronomer, was born at Sherborne, in Gloucestershire, in 1692. After gra-

duating at Oxford, where he had studied for the Church, he obtained in succession the livings of Brideslow and Welfric, in Pembrokeshire; but after his election as a Fellow of the Royal Society in 1721, he devoted himself wholly to science, and became Savilian Professor of Astronomy at Oxford. In 1741 he succeeded Halley as Astronomer-Royal, and received the honorary degree of D.D. from Oxford University. He died July 13, 1762. B.'s greatest discoveries are the Aberration of Light (q. v.), and the variation of the inclination of the earth's axis to the ecliptic.

Bradshaw, John, a keen and conscientious, but somewhat narrow Puritan, was born in Cheshire in 1586, studied law at Gray's Inn, and soon became known as an able chamber counsel. In the struggle between King and Parliament he took the side of the latter, like his cousin Milton; became, in 1647, Chief-Justice of Chester, and in 1649 earned for himself a lasting name in history by presiding at the high court which tried and condemned Charles I. B. was handsomely rewarded for his services on this occasion, but he resisted Cromwell and the army, and was opposed to the Protectorate. Under Richard Cromwell he became Lord President of the Council of State. He died November 22, 1659. During the retaliatory persecution of the Puritans in the reign of Charles II., his body was exhumed, and hung on a gibbet, with those of Cromwell and Ireton.

Bradshaw's Railway Guide was first published in 1841, and is therefore the earliest, while it is also the best existing, of our many manuals of information for the traveller. It was founded by George Bradshaw, a printer and engraver of Manchester, who died in 1853. In its present form, extending to some 400 pages, it is published on the 1st of each month, and contains the newly-arranged tables of the various railway companies, besides a vast amount of valuable information relative to travelling by land or sea. It has been followed by publications of a similar character in France, Germany, America, and even in Australia. *B.'s Continental Railway Guide*, a companion volume for the various countries of Europe, containing also a handy topographical section, was first issued in 1847, and still continues to increase in size and in circulation. A regular series of handbooks, bearing Mr Bradshaw's name, is in course of issue, of which there have already appeared *France, Switzerland, the Overland Journey*, and the *Indian Presidencies*.

Bradypus. See SLOTH.

Braemar, a subdivision of the old district of Mar, in the S.W. of Aberdeenshire, remarkable for the romantic grandeur of its scenery. It lies among the Grampian Mountains, and contains, among other heights, Ben Macdui (4296 feet), Cairntoul (4245), Braeriach (4225), Cairngorm (4090), Ben-a-Buid (3869), Ben Avon (3826), and Lochnagar (3786). The predominating rocks are granite and gneiss. Alpine plants occur, and there is abundance of game, chiefly red-deer, roe, grouse, and ptarmigan. B. contains the head-waters of the Dee, and is traversed by General Wade's great military road from Blairgowrie to Fort George. Area of the united parish of B. and Crathie, 182,257 acres; pop. (1871) 1566. Balmoral (q. v.) lies towards the E., and in the heart of the parish is the village of Castleton, the great resort of visitors.

Braga, the capital of the province of Minho, Portugal, situated between the rivers Cavado and Deste, 35 miles N.E. of Oporto, in a malarious country. It is surrounded by old walls, beyond which several suburbs have spread, while it is further guarded by a castle, and is the residence of the Primate of Portugal, having a Gothic cathedral, an archbishop's palace, a large hospital, besides seven churches and many monasteries. The manufactures are chiefly linen, hats, jewellery, cutlery, and firearms. Pop. (1864) 19,514. B. is the Roman *Bracara Augusta*; became the capital of the Suevian kings, who here accepted Catholicism, A.C. 563; later on fell into the hands of the Arabs, but was captured by the army of Old Castile in 1040. It was long the residence of the kings of Portugal, and has still many Roman remains.

Braganza, or **Bragança**, the capital of the province of Traz-os-Montes, Portugal, on the Fervença, a branch of the Sabor, 92 miles from Oporto, in the N.W. angle of the kingdom. It has a strongly fortified castle, and is a centre of the Portuguese silk trade. B. was long the residence of the Dukes

of B., and gave name to the present royal dynasty. Pop. 3650.—**B.**, or **Oayté**, a seaport in the province of Para, Brazil, at the mouth of a river of the same name, about 100 miles E.S.E. of that of the Amazon, with a pop. of 6000.—**B.**, a town of Brazil, province of San Paulo, 95 miles N.N.W. of the port of Santos, and the terminus of an inland railway. Pop. 5000.

Bra'gi, in the Norse mythologic system, was the god of eloquence and poetry. In the prose *Edda* it is said that 'not only is B. especially skilled in poetry, but the art itself is called from his name *Bragr*, this word also meaning poet or poetess.' B. was the son of Odin and Frigga, his wife being Iduna. He is the Scandinavian Apollo, but is represented as an old man, not as a youth.

Braham, John, one of the greatest English tenor singers of his day, was born in London, of Jewish family, in 1777, and died February 15, 1856. He was most celebrated as a concert singer, and especially as a singer of national or patriotic songs. Some of his best songs were of his own composition, as 'The Death of Nelson,' 'The Cabinet,' 'False Alarms,' 'The Devil's Bridge,' &c.

Brah'e, Tycho, a distinguished Danish astronomer, was born at Kundsthorp, December 14, 1546. After studying for a few years at Copenhagen, he was sent by his uncle to Leipsic in 1562 to attend the law classes; but astronomy had greater attractions for him, and on his uncle's death he devoted himself wholly to this science. After spending some years in travel, B. returned to his native country, and soon obtained the patronage of the king, who subsequently built for his use a commodious observatory called Uraniberg on the island of Hoen, in the Sound. On the death of the king in 1588, B.'s position was changed, and in 1597 he was forced to leave the country. Having obtained the protection of Emperor Rudolf II., he settled at Prague, where he died, October 13, 1601. The great merit of B. as an astronomer lies in the rare industry and assiduity with which he observed and recorded the positions of stars and planets, and it was entirely due to these observations that Kepler was led to the conception of his three famous laws. For his theory of the solar system, see ASTRONOMY. His *Opera Omnia* were published at Frankfurt in 1648. See the biographies of B. by Gas-sendi (Par. 1655), Helfrecht (Hof. 1798), and Pedersen (Copen. 1838).

Brah'ma, or **Brahm**, the Self-existent or Supreme Being of the universe, according to the Hindu religion, from whom all other beings—the deities, men, the world—derive their existence. Other names are Parabrahma, Paratma, Ram, Bhas-savat.

Brah'mā, an emanation from the preceding, whose worship is taught in the Institutes of Manu, and who is the first person of the Trinity of modern Brahminism—B., Vishnu, Siva, the creating, preserving, and destroying principles. B., however, though once supreme, is but little worshipped now; he has but one temple in all India, Vishnu and Siva having attracted all the veneration. He is represented with four heads and as many arms, and in pictures is often painted red. See HINDUISM AND INDIA, RELIGIONS OF.

Brah'man, or **Brah'min**, a member of the highest caste or priesthood of the Hindu religion, from which name the latter is also called Brahminism.

Brahmanbe'ria, a town in the executive district of Tip-perah, province of Bengal, British India, about 270 miles N.E. of Calcutta, with which it has easy access by sea and by railway, extending from Calcutta (1874) in a N.E. direction 120 miles to Goalunda. Pop. (1872) 12,364.

Brahmapu'tra ('offspring of Brahma'), one of the largest rivers of Asia, rises in Tibet, and after an entire length, reckoning from the source of its great affluent the Tsanpu or Sanpu, of 1800 miles, enters the Bay of Bengal through the mouths of the Ganges. The branch long regarded as the main stream, and still called B. Proper, rises in the most easterly of the Himalayas, and flows W.S.W. for 200 miles before uniting in Assam with the Sanpu, which springs from the same swamp as the Sutej and the Indus, on the N. of the Himalayan range, and which has a

previous course, in an E. and S. direction, of about 1000 miles. The latter was little known, till recently, beyond the portion which, under the name of the Dihong, divides British India from Tibet for about 150 miles. After the confluence of the two branches, the B. flows S.E. for nearly 350 miles, sweeps round the Garo Mountains, then takes a S. course, and joins the Ganges near Goalundo, ultimately reaching the sea by a hundred mouths, of which the Waghna estuary is the chief. Drainage-area estimated at 360,000 sq. miles. The B. has few great tributaries or large towns upon its banks. It is navigable by steamers to the furthest corner of Assam, and forms the one means of communication between that remote province and the outer world.

Brah'min Ox, or **Zebu** (*Bos Indicus*), a species of *Bovida* (q. v.), or oxen, representing the domestic cattle of India. A prominent fatty hump is borne on the withers, and the dewlap is very pendulous. The limbs are slender, and the back slopes towards the tail. These animals are very lithe and active, and are used as beasts of burden, and in carriages. They are also found in China, Madagascar, and E. Africa. The B. O. is sacred to Brahma (q. v.).



Brahmin Ox.

Brahmo Somaj, 'or Theistic Church of India, may be said to have been founded at Calcutta, in January 1830, by Ram Mohun Roy, the enlightened Brahmin who procured the abolition of suttee, and constantly wrote against the prevailing idolatry, which he declared to be a perversion of the pure monotheism found in the Vedas as well as in Mohammedan and Christian scriptures. As the Vedic readings in the 'Society of God' (at first called Brahma Subha or Brahmiya Sumaj) were confined to those of the Brahmin caste, no great progress was made until 1843, when Debendra Nath Tagore, a wealthy Brahmin who had previously started the Tattvabodhini Sabha (or Society for the Knowledge of Truth), joined the two societies together, started a periodical called the *Patritra*, and prepared the 'Brahmic Covenant,' by which all members renounced idols, and engaged to worship the one God of the Vedanta, and to practise virtue. In 1847 there were 767 converts. Soon after, in spite of the resistance of the conservative party under Akhai Kumar Datta, the special infallibility of the Vedas was after study renounced; and the Brahma Dharma, published by Tagore in 1850, consisting of the Covenant and Four Articles of Faith (Bijam), appended to extracts from the later Hindu scriptures, and declared to be the basis of the society, is what any theist might adopt. Although converts continued to be made, and branch Somajes were started outside Calcutta, external conformity to Hindu sacraments was the rule among Brahmos; it was not till 1861 that Tagore himself discarded the sacred thread, and performed marriage without an idolatrous rite. But the true regeneration of the society came from Keshub Chunder Sen (born of the Vaidja or Physician caste, 19th November 1838), who having previously taught and written in its defence from 1859, was ordained a minister of the Somaj in 1862, and who immediately demanded the renunciation of the 'thread' by all ministers, and supported the intermarriage of castes. Tagore could not consent to this, and accordingly in 1865, Sen seceded with most of the younger members, and established the 'B. S. of India,' of which he became secretary. Progress and Bhakti (regenerating faith) is the motto of the Church, a spirit of earnest devotion distinguishing their Sankirtan (hymnal service), the Brahmotsab (or periodic festival), and the practice of singing in missionary bands through the Calcutta streets. The only fixed parts of the B. service are the Sanskrit Adoration Chant, Satyam jnanamantam Brahma, and the United Prayer, ending, Shanthi, Shanthi, Shanthi (peace). For lessons they use a compilation of theistic texts from Hindu, Jewish, Christian, Mahometan, and Parsee scriptures. By the aid of such men as Protab Chunder Mozoomdar, the theistic movement has been extended to all the Presidencies and the Punjab, there being now 95 Somajes in India (*Theistic Annual* for 1875), containing not more than 6000 members in all, recruited mainly from young men taught at the English colleges. Their views are expounded in the *Indian Mirror* and the *Dharma Tatva*; and the B. Mission Office, the B. School, and the Society of Theistic Friends,

all at Calcutta, show the zeal which Sen has infused into his followers. Since his visit to England in 1870, he has also started the Indian Association for Social and Moral Reformation of Natives, the most important work of which has been the foundation of the Normal School for female adults, and of the girls' school attached to it. Episcopalians and Presbyterians co-operate in this. The non-idolatrous marriages having been pronounced invalid, Sen led the movement which resulted in civil marriages, under restrictions as to age, being permitted under the Native Marriage Act of 19th March 1872. In the large towns the Brahmos have merely to encounter the social and domestic inconveniences implied in 'outcasting'; in the country districts violent acts of persecution have occurred. It may be added that the Adi, or original Somaj, under Tagore, still exists, and was strongly opposed to the Marriage Act; and that the 'Prarthana Somaj,' or Prayer Society of Bombay, is independent of the B. S. The characteristic of the later movement is intellectual eclecticism combined with a fervent piety and a practical philanthropy. A number of interesting publications may be got from Isbister & Co., London, or from the Society's office, 1 Mirzapore Street, Calcutta.

Brahms, Joh., a distinguished living pianist and composer, born at Hamburg, 7th May 1833, where his father was contrabassist at the theatre. On a professional journey in 1853 he met Schumann at Düsseldorf, became his enthusiastic admirer, and is now his greatest living follower. In 1863 B. became Director of the Sing-Akademie at Vienna, in which city he has since lived. His compositions are numerous in all departments except the dramatic, but they are more popular in N. than in S. Germany. B.'s greatest work is probably his *Ein Deutsches Requiem* by which also he is best known in this country.

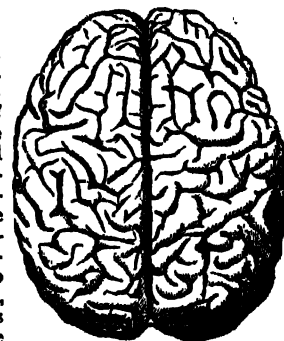
Braïla, Bراهيم, or Ibrail, next to Galacz, the most important trading place of Roumania, and a free port of Wallachia, formerly a fort, situated on the left bank of the Danube, about 100 miles from its mouth, and where it is entered by the Sireth in six streams. It is 11 miles S. of Galacz, and 92 S.W. of Bucharest by railway (completed 1873), and has a large and growing export trade, chiefly in wheat, maize, barley, rye, colza, linseed, timber, petroleum, and flour. B. is the seat of a district presidency, and contains a quarantine hospital, several churches, and many handsome rectangular streets. In 1872-73, the increased traffic in the river had led to the construction of extensive new wharves and quays, while the town was being lighted with gas, and regularly supplied with purified water. No record of the trade is kept by the customs and port authorities. Pop. 25,767. In the last half of the 18th c., B. was repeatedly stormed and taken by the Russians, who finally destroyed it by fire in 1770. Restored to the Porte by the peace of 1774, it was once more occupied by the Russians in 1828, but finally reverted to Turkey on the Peace of Adrianople in 1829.

'Braïls, a nautical term, meaning small ropes for gathering up a yard to the bottom and skirts of its sail, preparatory to furling. The sail is 'brailed up' when the braïls are hauled taut.

Brain is the name given to that part of the nervous system contained within the cranium or skull. The B., with the Spinal Marrow (q. v.), constitutes what anatomists have described as the *cerebro-spinal axis*. The B. (or *encephalon*) is covered with three membranes, called *dura mater*, *arachnoid*, and *pia mater*. 1. The *dura mater*, the most external, is a thick, fibrous membrane, and lines the interior of the skull. It adheres closely to the inner aspect of the bones of the skull, forming to them a kind of periosteum. The inner surface of this membrane is serous, and covered with epithelium. 2. The *arachnoid*, so named from two Greek words signifying *like a spider's web*, is a very thin, delicate, serous membrane. It envelops the B. without dipping into the fissures between the convolutions of the B. It lies between the *dura mater* and *pia mater*. Between it and the *pia mater* is the sub-arachnoid space containing serous fluid, the *cerebro-spinal fluid*. 3. The most internal membrane of the B. is called *pia mater*. This, like the *dura mater*, is a vascular membrane. It envelops closely the B., dipping deeply between the convolutions of the B. It has also lymphatics and nerves. After removing the membranes of the B., the B. proper is ex-

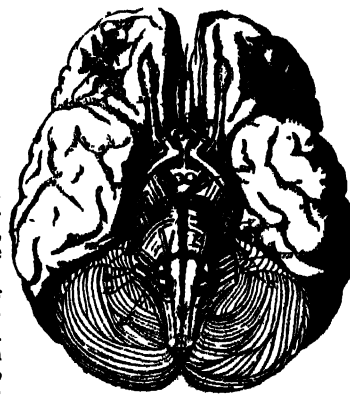
posed to view. This may be divided into four parts—*cerebrum*, *cerebellum*, *pons varolii*, and *medulla oblongata*.

1. **Cerebrum**.—This forms by far the largest portion of the human B., and occupies a large portion of the interior of the skull. It is constricted on its under surface, and at this constriction it passes into the *cerebellum* and *pons varolii*. The cerebrum forms the whole upper surface of the B., entirely concealing all the other portions. When looked at from above, the B. is seen to be divided throughout its entire length by a deep fissure running in a straight line from before backwards, called the *longitudinal fissure*. This fissure divides the cerebrum into equal parts, called the *hemispheres* of the B. Anteriorly and posteriorly it penetrates the whole depth of the B., but in the centre it is intercepted by a band of white tissue running across from right to left, called the *corpus callosum*, and uniting the two hemispheres of the B. That portion of the *dura mater* which dips into this fissure is called the *falx cerebri* from its resemblance to a sickle. Besides the longitudinal fissure dividing the B. into the *right* and *left* hemispheres, there are other well-marked fissures. Of these, the chief are—(1) Fissure of Sylvius, which runs transversely and separates the anterior from the middle lobes of the B. At the outer part of the hemisphere it divides into two branches, which enclose that portion of the B. called *island of Reil*. (2) Fissure of Rolando, also a transverse fissure, and of importance as being peculiar to the B. of man and of the higher monkeys. Besides these there are other named fissures; and between each convolution there is a fissure (or *sulcus*) running zigzag, and dipping more or less deeply into the substance of the B. Anatomists have usually divided each hemisphere of the B. into three lobes—*anterior*, comprehending that part in front of the fissure of Sylvius; the *posterior lobe*, that portion lying over the *cerebellum*; and the *middle lobe*, that part between the other two.



Brain—Upper.

Internal Structure of Cerebrum.—On slicing off portions of the B. to a level with the transverse fibres called *corpus callosum*, the white tissue of this structure is brought into view; and if we divide longitudinally this band of white fibres a little to each side of the middle line, we expose a cavity on each side called the *right* and *left ventricles*. These cavities are lined with a serous membrane, contain fluid, and in the disease known as *water in head*, true *Hydrocephalus* (q. v.), become enormously distended with fluid. The partition separating these two cavities is called *septum lucidum*. These ventricles have been divided into three parts, anterior, posterior, and middle, corresponding to the three lobes of the B.



Brain—Lower.

2. **Cerebellum, or Little B.**, is situated behind, and in man is entirely covered by the cerebrum. It is joined to the cerebrum by the *crura cerebri*, and to the *medulla oblongata* by the *inferior peduncles*, and to the *pons varolii* by the *middle peduncles*. It is about 3½ or 4 inches in the transverse diameter, and about 2 inches from before backwards, and at its deepest portion not more than 2 inches. It consists of two hemispheres joined together in the middle. It is not, like the cerebrum, divided

into convolutions, but is composed of numerous laminae or plates.

3. *Pons Varolii* is that portion of the B. which unites the various parts together. It is connected with the cerebrum above, the cerebellum behind, and the medulla oblongata below. It consists of transverse and longitudinal layers of white matter, with grey matter interspersed.

4. *Medulla oblongata* is that portion of the B. which is continuous with the spinal chord below and with the pons varolii above. It has much of the structure of the chord. The space between the medulla oblongata and the cerebellum is called the *fourth ventricle*, which communicates with the *third ventricle* by the passage of Sylvius. The third ventricle is a narrow fissure between the optic thalami, and communicates by the foramen of Monro with the lateral ventricles.

Structure of the B.—Externally it is composed of grey matter, and internally of white matter. The grey substance is composed to a great extent of peculiarly shaped cells, having many processes radiating from them, whereas the white matter is composed of fibres or tubes which convey *influences* to and from the grey matter. The grey matter extends into the bottom of all the convolutions, and is found in masses of various shapes and sizes in the interior and under surface of the B., called *ganglia*. These ganglia will be described under separate heads.

For chemical composition of the B., see NERVE TISSUE.

Many of the most important structures connected with B. are situated on its under surface, and will be fully described under their respective names.

Development of B.—In early foetal life the B. is not distinguishable from the spinal cord, but after a time the end gradually expands and develops into the various structures composing it. At birth the convolutions are not formed, but are developed afterwards and gradually. As these develop, intelligence is manifested. There is a marked degree of relation between the intellect and the number and complexity of the convolutions of the B. In certain distinguished men this has been most marked. There is a certain proportion between the weight of the B. and the intellect of the individual. Great men have generally the largest amount of B., and idiots have frequently very light B. The B. of males is heavier than that of females. The average weight of B. in an adult male is about 48 oz., and in females 43 oz. At birth in the male it is nearly 14 oz., and in the female a little above 12 oz. The B. of the distinguished naturalist Cuvier is said to have weighed more than 64 oz. The B. of man is heavier than that of all animals except the B. of the whale and elephant. The B. of the elephant is said to weigh about 9 lbs., that of the whale about 5 lbs.

For a description of the B. of different classes of animals, see under the various classes.

Diseases of the B. will be treated under their respective names, as APOPLEXY, INFLAMMATION OF B., HYDROCEPHALUS, &c.

Brain Coral (*Meandrina*), a genus of *Sclerodermic* corals, so named from the surface of the coral structure presenting windings resembling the convolutions of the human brain. The surface is hollowed out into sinuous, shallow, elongated cells, which combine to form a massive polypidom or compound mass. These corals are chiefly found in the Indian and S. Atlantic Oceans, and sometimes attain a diameter in masses of 8 or 9 feet. *Meandrina cerebriformis* is a familiar species, and aids in the formation of coral reefs.

Braine-le-Comte, an ancient town of Belgium, province of Hainault, on the Brainette, 18 miles S.S.W. of Brussels by railway. It has active cotton manufactures, brewing, dyeing, &c., and produces some of the finest flax and lace-thread in the world. Pop. (1873) 6464. In 1158 Count Baldwin bought B. from the monks of St Waudru at Mons, to whom it had belonged formerly.

Brain-tree, an old market-town, county Essex, 38 miles N.E. of London, and 18 W. of Colchester by railway, with manufactures of silk, straw-plait, and crape. Pop. of parish (1871) 4790.

Brake, or **Bracken**, a name generally applied to the common fern, *Pteris aquilina*, which is widely spread over the world. The specific name *aquilina* is given to it because in cutting across the underground stem (rhizome or root-stock) it appears

something like a spread eagle (Lat. *aquila*). The root-stock is bitter, but contains considerable nutriment. It is eaten by the Vancouver Island Indians; and in times of scarcity, in some districts of Europe, has been made into a kind of wretched bread. It is astringent and anthelmintic. The ashes are employed in making soap and glass, and the fronds for littering cattle, and even, when mixed with straw, for feeding them. It is difficult to extirpate; but the best method of doing this is to repeatedly mow it as soon as it appears, when the vitality of the plant is destroyed. There are many other species, most of which, both in their good and bad qualities, do not differ widely from the familiar British B.

Brake, an apparatus by which the energy of a moving body may be absorbed by friction, in order either to stop or retard its motion, as in the B. upon a train, or to use up surplus energy, as in the testing of engines 'on a B.'

Bra'ma (Cuvier), a genus of Teleostean fishes of the family *Chatodontida*, possessing much-compressed, high bodies, with the dorsal and anal fins scaly. The profile is deep and abrupt, and slender, curved teeth exist in the jaws and palate. The caudal or tail fin is very high, narrow, and crescentic. The common species (*Brama Raii*), or Ray's bream, sometimes found on British coasts, and common in the Mediterranean Sea, is also known by the name of 'sea-bream.' Another species is the *B. pinnaquamata*. The flesh is very palatable.

Bra'mah, Joseph, a distinguished mechanical inventor; the son of a farmer, was born at Stainborough, Yorkshire, 13th April 1749. After establishing himself in London, he patented numerous ingenious inventions, of which his improvements in fire and steam engines, in paper-making, and in wheel-carriages, locks, &c., merit notice. The *B. press* (see HYDROSTATIC PRESS) was constructed about 1800. B. died December 9, 1814. See Dr Brown's sketch of B.'s life in the *New Monthly Magazine*, April 1844.

Braman'te, Donato Lazzari, a famous Italian architect and painter, was born at Monte-Asdroaldo, Urbino, in 1444. In Milan he studied carefully the construction of the famous cathedral, and in Rome the numerous monuments of antiquity there. He was successively employed by Sforza and the Popes Alexander VI. and Julius II. He revived the taste for the ancient architecture—his masterpiece in this department being the small church of San Pietro in Montorio. Among his other works are the palaces Giraud (now Torlonia) and Sora, and the immense galleries which unite the two pavilions of the Belvedere to the Vatican. He died at Rome in 1514. B. figures in the 'School of Athens' of Raphael, for whom he had procured the patronage of Pope Julius II. His pictures, both in fresco and oil, are numerous in Lombardy, and are highly esteemed. He has also written some poetry, which was published in 1753. See Quatremère de Quincy's *Vies des Architectes Célèbres*.

Brambanan', a district of Soorakarta, in Java, notable as containing not fewer than 296 Brahminical temples, more or less entire. The largest of these temples is an imposing structure, richly ornamented with mythological figures.

Bram'ble (*Rubus fruticosus*), a common British plant belonging to the order *Rosacea* (q. v.). It is rarely cultivated, but is abundant in a wild state. Its fruit is gathered for the manufacture of a 'wine' much esteemed among connoisseurs in such homely taps. There are many species of *Rubus*, but the genus is so variable that no two botanists are agreed as to what are species or what only varieties. Many species are met with in Asia and N. America. *R. nutkanus* (the 'thimble-berry') and *R. spectabilis* ('salmon-berry'), from N.W. America, have fruits which supply a large portion of the food of the Indians, who dry them also for winter use. They are cultivated for their flowers in this country.

Bram'ble, or **Mountain Finch** (*Fringilla montifringilla*), an *Insectorial* bird, belonging to the *Fringillida* or finch family, found in Britain in winter only, and as a mere visitant distributed widely over Europe and Asia. In winter it occurs also in Italy, Malta, Smyrna, &c. The B. breeds in Scandinavia. It averages an ordinary chaffinch in size. The males are coloured brown, interspersed with black on the upper parts in winter,

and black in spring and summer; the throat and breast during the latter season being fawn coloured, whilst the wings are banded with a white and black stripe. The tail-feathers are black, with reddish-white margins, and the tail itself is forked. The song is a mere chirp.

Bran, the husk or outer covering of the grain of wheat. It is separated in grinding in thin sharp scales of a brown colour, and contains a large proportion of indigestible woody fibre. It, however, possesses a high percentage of nitrogenous matter in the form of cerealin and of salts. B. is chiefly used for the feeding of horses and pigs, and in medicine it is a useful medium for applying heat externally. B. taken internally has a tendency to cause diarrhoea, by mechanically irritating the intestinal coats.

Branch is, in botany, applied to any subdivision of a stem which does not arise directly from the root. Branches originate in leaf buds at *Nodes* (q. v.), and are given off at various angles from the stem, giving rise to the different contours of shrubs and trees. M'Cosh and Dickie believe that the angle at which the branches are given off from the stem, as well as the general ramification, agrees in many cases with the angle at which the veins are given off from the mid-rib, and with the general venation in the leaves of the same tree. The *runner* in the strawberry plant is a B. which runs along the ground, and sends out roots from its under surface, producing new plants; while the tubers of the potato plant—the ordinary edible 'potato'—is not a root, but a shortened underground stem, in the cellular substance of which starch has accumulated.

Branchiæ, the scientific name applied to the gills of animals. See GILLS. The presence of these structures is associated with an aquatic existence, and they form valuable guides in the classification of animal forms.

Branchial Arches, the name applied to the bony arches of fishes, which exist on each side of the throat, and are attached superiorly to the under surface of the skull. They support the gills or *Branchiæ*, and each arch is composed of two distinct pieces, known as the *cerato-branchial* and *epi-branchial* bones. The B. A. grow successively smaller as they recede from the mouth, and in many fishes may support teeth.

Branchial Heart, the name applied to the heart in fishes, for the reason that its sole function consists in driving the venous or impure blood to the *branchiæ* or gills for purification. This name is used in contradistinction to the same *systemic heart*, which (as in *Gasteropodous Mollusca*) drives the *pure* blood through the system. In *Cephalopoda* (q. v.), or cuttlefishes, a B. II. exists at the base of each gill in addition to the systemic heart; and by means of these branchial hearts the venous blood is propelled to the gills to be aerated.

Branchial Sac, the term applied to the breathing chamber of the *Tunicate* (q. v.), molluscs or 'sea-squirts,' which consists of a sac, the walls of which are composed of a network of blood-vessels, in which the venous blood is exposed to the oxygen contained in the water admitted to the sac.

The name is also applied to the pharyngeal dilatation or sac seen in the *Amphioxus* or Lancelet (q. v.)—the lowest member of the fish-class—and which is also used for respiration.

Branchiata, the name given to various groups of animals from the fact of their possessing *branchiæ* or *Gills* (q. v.). Thus the *fishes* and *amphibians* (as frogs, &c.) together form the *Branchiate Vertebrata* from the fact that they possess gills at some period of life—the fishes during the whole of life, and the *amphibia* always in *early* life; the breathing, in the latter case, being afterwards carried on partly or entirely by lungs. The *Branchiate Gasteropodous mollusca* include the *whelks*, &c., which breathe by gills, as distinguished from the *snails* or *land gasteropods*, which respire by means of pulmonary or lung-sacs. The name *Abranchiate* is used in opposition to the foregoing term.

Branchiopoda, a section of *Crustacea* (q. v.), including the orders *Cladocera* (water-fleas, &c.), *Phyllopoda* (fairy-shrimps, brine-shrimps, &c.), and probably also the extinct *Trilobites*. These crustaceans possess numerous *branchiæ* or gills attached to the legs, and hence the name of the section, which literally

means 'gill-footed.' In some cases the legs themselves constitute the breathing-organs. The body may be unprotected, or wholly or partially enclosed within a *carapace*; and the mouth is furnished with masticatory organs.

Bran'co, Rio, a river of Brazil, the largest affluent of the Rio Negro, rises in the Parime Mountains, near the sources of the Orinoco, and flows S.S.W. for a distance of about 700 miles. When it joins the Rio Negro it is a mile broad, but rapids and waterfalls render it scarcely navigable.

Bran'cursus. See ACANTHUS.

Brand (Ger. *brennen*, to burn), the German name for the disease known in Britain as bunt, or pepper B., but also applied to Blight, Mildew, Rust, and Smut (q. v.).

Brandenburg, a central province of Prussia, with an area of 15,565 sq. miles, and a pop. (1871) of 2,863,229, of whom 42,722 are Wends. It arose mainly out of the old *Mark of B.* (i.e., the *Kurmark*, or Mark of the Elector), which consisted of the *Altmark* and the *Neumark*, but it has ceased to correspond exactly to the old territorial boundaries. It is divided into the three districts Berlin, Potsdam, and Frankfurt, and the city of Berlin is its capital. The country is everywhere flat and sandy, being in parts, however, extremely fertile, and is watered by the rivers Elbe, Havel, Spree, Oder, Warthe, and Netze. There are numerous lakes, of which the principal are the Schwielowzer, Scharmüzzel, Ucker, Plauer, Ruppiner, and Fahrland See, and the water system is further augmented by the Finow, Friedrich Wilhelm, Ruppiner, and Templiner Canals. Chief among the articles of product are barley, rye, maize, potatoes, and buckwheat, and the most important manufactures are woollen and cotton cloths, linen, shawls, tapestry, machinery, glass, chemicals, chocolate, and tobacco. B. has good pasturage, and produces the celebrated Berlin wool (*Electoral-Wolle*), held to be the best in the world. The only minerals are rock-salt and gypsum, found near Sperenberg. B. is traversed by the Elbe and Hamburg Railway, which has a length in the province (1872) of 700 miles. The population is composed of 2,720,242 Protestants, 86,047 Catholics, 47,484 Jews, and 5541 members of small Christian sects. The province has one university and eighteen gymnasia.

About the beginning of the Christian era the land now known as B. was occupied by the Semnones and the Longobards, next by the wandering Slavic tribes of the Hevellern, Wilzen, Redarier, and Obotrites; was subdued by Karl the Great in 789, and afresh by Heinrich I. in 928. In 931 it was made the *Nordmark* of N. Saxony (now *Altmark*), while the *Ostmark* (Niederlausitz) was founded by Gero, who died in 963. The Nordmark became the possession of the Princes of Stade in 1056, and was granted by the Kaiser, Lothar II., to Albrecht the Bear (q. v.), of the house of Ascania. In 1143 Albrecht also received the *Ostmark* as a fief of the empire, and henceforth named himself *Markgraf von B.* He next added to his dominion the *Mittelmark*, *Priegnitz* and *Uckermark*, wrested from his neighbours the Wends, who were all but extirpated by his merciless raids; the conquered territory being afterwards colonised by Rhenish, Dutch, and Flemish settlers. Albrecht was followed in succession by Otto I. in 1170, Otto II. in 1184, Albrecht II., founder of Berlin, in 1206, and Johann II. and Otto III., who reigned together 1226-58. In 1258 B. was divided between Johann I., head of the old B. Ascanian line of Stendal, and Otto III., founder of the younger line of Salzwedel. The former line expired in 1320, and the latter in 1317. A period of disorder followed, during which the Emperor Ludwig IV. (1324) placed over the *Markgrafsdom* his son Ludwig, who was succeeded by his brother Ludwig *der Römer* (1352), and in turn by Otto VII., the Lazy, who in 1363 entered into a treaty with the Emperor Karl IV., by which the *Kurmark* reverted to the house of Luxemburg. But Sigismund, son of Karl IV., sold *Neumark* to the German Order (1402), and mortgaged the land of B. (1411) to Friedrich VI. of Hohenzollern for £20,000. In



Branchiopoda.

1415 the territory was united to Nürnberg, the new ruler assuming the title of Friedrich I., Elector of B. Its further history is merged in that of Prussia (q. v.). See Küster, *Bibliotheca Historica Brandenburgensis* (Bresl. 1743), Riedel, *Codex Diplomaticus Brandenburgensis* (Berl. 1839-62), and Voigt, *Geschichte des Brandenb.-Preuss. Staats* (Berl. 1860).

Brandenburg (Wend. *Brennaborch* or *Brennibor*), the ancient town from which the province receives its name, formerly the capital of the Heveller, a Slavic race, and later of the Uckermark, is situated on the Havel, 37 miles W.S.W. of Berlin by railway. It is divided into three parts by the Havel—the old and new town on the opposite banks, and the *Dom* of B. on an island in the river. It is still the seat of the district courts, and has many high-class schools and charitable institutions. In the vicinity of the old town rises the Marienberg, some 200 feet high, on the summit of which once stood a heathen temple, which latter gave place to the famous Marienkirche, destroyed in 1772. The principal buildings are the cathedral (built 1170, restored 1836) and the citadel, both on the island, and St Katherine's Church (1401) in the new town. There are many beautiful promenades. B. has manufactures of woollens, silks, gold-lace, oil, and leather, and also some trade and fisheries in the Havel and the adjoining Beetz and Plauer Lakes. Pop. (1873) 25,822, including a garrison of 1013. B. was inhabited by the Wends as early as 927, became the seat of a bishop under Otto I. in 949, and the administration of its cathedral was secularised in 1598. See Heffter's *Geschichte der Kur- und Hauptstadt B.* (Potsd. 1839), and his *Wegweiser durch B. und seine Alterthümer* (Brandenb. 1850).

Brandenburg, New, next to Neustrelitz the most important town in the Grand-duchy of Mecklenburg-Strelitz, on the Tollen Lake, and on the Hamburg-Stettin Railway, about 60 miles W.N.W. of Stettin. It was formerly a strong town, and has still four beautiful old Gothic gates. Its finest buildings are the ducal palace, the restored Gothic Marienkirche, a theatre, and the Belvedere, a summer palace on the lake. The chief manufactures are woollens, damasks, tobacco, paper, beer, and brandy. There is an important wool and cattle market here. Pop. (1873) 7245.

Branding was formerly a punishment in England for various offences. At one time, it was awarded to all criminals found entitled to Benefit of Clergy (q. v.). Now, however, B. is confined to deserters from the army, the provision of the Mutiny Act being that 'on the first and on every subsequent conviction for desertion, the court-martial, in addition to any other punishment, may order the offender to be marked on the left side, two inches below the arm-pit, with the letter D; such letter to be not less than one inch long, and to be marked upon the skin with some ink or gunpowder, or other preparation, so as to be visible and conspicuous, and not liable to be obliterated.' The position for the mark seems hardly to be chosen with the view of its being 'visible and conspicuous.'

Brandis, Christian August, a German philosopher, son of an eminent physician, was born at Hildesheim, 13th February 1790. In 1816 he removed from Copenhagen, where he had been lecturing on philosophy, to Berlin; and there, in 1823, he published the *Metaphysics* of Aristotle, followed in 1836 by *Scholæ in Aristotelem*, and in 1837 by *Scholæ Græcæ in Aristotelis Metaphysicam*. His *Mittheilungen über Griechenland* (Leips. 1842) was written in Greece, where he was a member of King Otto's Council. His *Handbuch der Geschichte der Griechisch-Römisch. Philosophie* (Berl. 1835-60) is an invaluable contribution to the history of philosophy. B.'s latest work was his *Geschichte der Entwicklungen der Griech. Philosophie* (2 vols. Berl. 1862-64). He died 24th July 1867.

Branding. See PARR and SALMON.

Brandon (Welsh, 'the brow of the hill'), a market-town on both the Suffolk and Norfolk side of the Little Ouse, 78 miles N.N.E. of London, and 30 N.W. of Cambridge by railway. It has several charitable and educational endowments, and some trade in corn, malt, and timber. Pop. (1871) 2116.

Brandt, Sebastian, author of the *Narrenschiff* ('Ship of Fools,' Lat. *Stultifera Navis Mortalium*), was born at Strasburg

in 1458, became a Professor of Law at Basel, and afterwards Syndic of his native town, where he died in 1521. B.'s chief work is a satiric poem, written in German, and afterwards translated into Latin. It was read all over Europe, and was famous for more than two centuries; yet it has not much poetic force or liveliness. There is no fine invention or brilliant imagery; but the moral reflections are weighty and sensible. It formed the model of Barclay's well-known *Ship of Fools*. The work is now very rare. After the German edition of Basel, and the Latin of Lyon, the date of neither of which is known, the oldest is that of Strassburg (1491; new ed. by Zarncke, Leip. 1857).

Brandy (Fr. *eau de vie*; Ger. *branntwein*) is the spirit for drinking distilled from wine, which owes its peculiar flavour to the presence of minute quantities of ceanthnic, acetic, butyric, and valerianic ethers. It also contains a little tannin, extracted from the casks in which it is stored, to which it owes its pale yellowish colour, and when it is deep brown it has been so coloured by caramel or burnt sugar. The specific gravity of B. should be from '929 to '934; it should contain from 50 to 60 per cent. of alcohol, 1·2 of solids, about 1 grain of acid in every ounce, and it should be free from sugar. The best brandies are those manufactured in Cognac, in France, but they are distilled in most wine-producing countries, and experts can recognise the produce of different localities by the peculiar aroma of each. Large quantities of factitious B. are prepared in Great Britain from grain spirit, which is flavoured to imitate cognac by the addition of Hungarian oil or ceanthnic ether, and a much more deleterious spirit is prepared abroad from potato-spirit, which is freely passed as B. As potato-spirit contains a large proportion of fusel oil, its effects are very hurtful to those who drink this spurious B. The quantity of B. imported into Great Britain in 1873 was 6,483,486 gallons, on which a duty of £2,375,447 was paid. Of this quantity no less than 6,378,398 gallons were imported from the Cognac district.

Brandywine Creek, a N. American stream, 36 miles long, rising in Pennsylvania, and flowing through Delaware to Christina Creek, with which it joins the Delaware river, immediately below Wilmington. It has a place in history as the scene of an adva. gained by the British during the War of Independence in September 1777.

Brank, an instrument formerly used in England and in Scotland for the 'taming of the shrew.' In England, it was called 'the scold's bridle.' It was a kind of iron mask, which covered the head and face, with apertures for the nostrils and eyes. At the mouth, a plate of iron projected inwards, so as to press upon the tongue of the culprit, who was thus effectually gagged. In a work called *England's Grievance Discovered in Relation to the Coal Trade*, published in 1655, and dedicated to Oliver Cromwell, there occurs the following description of punishment by B. :—'John Willis, of Ipswich, upon his oath, said that he was in Newcastle six months ago, and there he saw one Anne Bidlestone drove through the streets by an officer of the same corporation, holding a rope in his hand, the other end fastened to an engine called the B., which is like a crown, it being of iron, which was muzzled over the head and face, with a great gap, a tongue of iron forced into her mouth, which forced the blood out; and that is the punishment which the magistrates do inflict upon chiding and scolding women, and that he hath oft seen the like done to others.' In a B. preserved in the County Hall of Forfar, called 'the witches' bridle of Forfar,' dated 1661, the gag is a long piece of iron, with three sharp spikes. A B. may be seen in the Ashmolean Museum at Oxford, and in the National Antiquarian Museum of Edinburgh, and in several other places in England and Scotland.

Brantôme, Pierre de Bourdailles, Seigneur de, a French historian, born at Périgord about 1540. He was chamberlain to Charles IX. and Henry III., studied war under François de Guise, and fought against the Huguenots and Turks. He died 15th July 1614. B.'s principal works are his *Mémoires*, his *Vies des Hommes illustres et grands Capitaines Français*, his *Vies des grands Capitaines Étrangers*, his *Vies des Dames illustres*, and his *Vies des Dames galantes*. The *Œuvres de B.* were published at the Hague, in 15 vols., in 1740; and republished at Paris, in 8 vols., in 1787. They furnish lively pictures of the

times, and the author's complacency is amusing. He predicted their well-merited success.

Bras-dor's Operation is a cure for Aneurism (q. v.), and consists in applying a ligature to the artery on which the aneurism is situated, not on the cardiac side of the aneurism, but on the distal side, or that side which is farther from the heart than the tumour. Obstruction occurs at the point tied, and coagulation of the blood in the artery takes place back to the point where the next branch is given off, and so favours the cure of the aneurism. B. O. is only to be performed when the vessel cannot be safely tied on the side of the aneurism next the heart. When a large branch of an artery is given off between the aneurism and the point tied, B. O. will fail to effect a cure.

Brasenose, an Oxford college, otherwise named King's Hall, founded in 1509 by William Smith, Bishop of Lincoln, and Sir Richard Sutton, Prestbury, Cheshire, for a principal and twelve fellows. The number of fellowships was afterwards increased to twenty. The name is said to have grown out of 'Brewing-house,' but probably arose from the college having been partly built of the ruins of the hostel of B. Hall, and a brazen nose actually projects over the gateway. There are seventeen Hulme exhibitions, the present worth of each of which is £135, with an allowance of £20 for books. The senior fellowships had become of great value, but the commissioners under 17 and 18 Vict., c. 81, limited their value to £300 per annum, raising the junior fellowships from £80 to £150. The suppression of five of the fellowships left funds free for the endowment of a professor and for some additional scholarships. The college has the presentation to twenty-three livings, and the trustees of the Hulme exhibitions have twenty-nine pieces of preferment in their gift. The fellowships, which were formerly confined to the natives of certain counties, are now open. The number of names on the books in 1874 was 508, and the number of undergraduates 112.

Brash, Water. See PYROSIS.

Brasidas, a distinguished Spartan general, who was appointed *Ephor Eponymus* for having relieved Methone when besieged by the Athenians at the beginning of the Peloponnesian War (B.C. 431). In 424 he relieved Megara, and in 422, with greatly inferior forces, defeated the Athenians under Cleon, both generals being killed in the action. The allied troops were present under arms at his burial within the walls of Amphipolis, and his memory was long preserved by yearly sacrifices at his tomb, and by the institution of games in his honour. He was a mixed character, undoubted heroic qualities co-existing with equally undoubted duplicity, a quality which gave him unusual dexterity and tact as a negotiator.

Brass is an alloy of copper and zinc, but frequently contains small quantities of iron, tin, or lead. B. was formerly manufactured by heating a mixture of calamine (carbonate of zinc), charcoal, and copper to a temperature rather less than that required to melt copper, when the charcoal reduced the calamine, and the zinc, as fast as it was formed, became alloyed with the copper. B. is now made by directly alloying the two metals. The copper is first melted, the proper proportion of zinc then added, and the resulting metal cast into ingots. The colour and properties of B. vary with the proportions of its constituents. Thus, by fusing 53.49 parts of zinc with 46.51 of copper, a brittle crystalline alloy is obtained of a *silver white* colour, whereas ordinary B., which contains about 64 per cent. of copper, is ductile, malleable, and of a golden colour. The addition of a small quantity of lead greatly increases the hardness of B., and prevents it from clogging the file, and for the same reason renders it suitable for being turned on the lathe. A small proportion of tin also hardens B., and is added to B. which is to be engraved. The specific gravity of B. (8.3) is greater than the mean of the specific gravities of its two constituents; in other words, contraction takes place when copper is alloyed with zinc, and this contraction is accompanied by a rise of temperature. Both these facts would indicate that B. is really a chemical compound, or at least contains a chemical compound of the two metals of which it is formed, and this supposition is strengthened by the fact that B. can be deposited by galvanic action. See ELECTROLYSIS.

Muntz metal contains from 60 to 70 per cent. of copper, and from 40 to 50 per cent. of zinc. It can be rolled into plates whilst hot, and is used as a sheathing for ships.

Aich or Gedge's metal contains 60 per cent. of copper, 38.2 of zinc, and 1.8 of iron. It can be forged, cast, and rolled, and is also well adapted as a sheathing for ships.

Sterro metal (Gr. *sterros*, firm) is a very hard alloy, containing 55 per cent. of copper, 42.4 of zinc, 0.8 of tin, and 1.8 of iron.

Hard solder is made by fusing together two parts of B. and one of zinc. When B. is strongly heated, the zinc which it contains volatilises—indeed, it is not possible even to fuse it without loss of zinc occurring.

Brass-arms, uniting the shoulder and elbow pieces of the plate-armour worn in former ages, protected the upper part of the arms. Demi-B. shielded only the front of the arms. *Brachiale* was the ancient name for B.

Brasses, Monumental, slabs or plates of brass, or of a mixed metal called *latten*, or *Cologne plate*, inlaid in tombstones



Monumental Slab in Bruges Cathedral.

usually placed on the floors of churches. The effigies of the deceased persons, or appropriate symbols, are incised in outline upon these plates, and the incisions filled up with bitumen or other black substance: in the very early B. enamelled work also occurs. In England about 4000 B. are preserved, a much larger number than exists in any other country in Europe, owing, probably, to their almost total destruction on the Continent during the many revolutionary changes which have occurred there; in England, too, the number of B. has been greatly lessened by the vandalism that accompanied the Reformation and the civil wars of the 17th c. Their use was introduced into England from Flanders early in the 13th c., but the oldest example extant is in Rochester Cathedral, on the tomb of Walter de Merton, who died in 1277. The eastern counties of England, from Kent to Norfolk, with the adjoining counties of Surrey, Sussex, Middlesex, and Berks, furnish by far the larger portion; a few are preserved in cathedral and conventual churches in the W. of England; in the other parts of the United Kingdom examples are extremely scarce. Old B. are remarkable for their chaste and beautiful designs, often expressed in a few simple lines; and where effigies are depicted, valuable sources of information to the artist are provided regarding the varied costumes worn by different ranks of society

during a period of nearly four centuries. The use of B. in England appears to have declined about the time of Charles I., but the fashion has been revived of late years. An estimate may be formed of the kind of metal employed for B. from the analysis of a Flemish specimen, which yielded in 100 parts, 64 of copper, 29.5 of zinc, 3.5 of lead, and 3 of tin. See Cotman's *Engravings of the Sepulchral B. in Norfolk and Suffolk* (new ed. 2 vols. Lond. 1874), and Haines' *Manual of M. B.* (2 vols. Lond. 1873).

Brassica, a genus of plants belonging to the natural order *Crucifera* (q. v.), to which many cultivated plants, such as Cabbage (q. v.) and its varieties (kale, borecole, colewort, greens, cauliflower, broccoli, Brussels sprouts, and kohlrabi), Turnip (q. v.), Navew (q. v.), &c., belong. The Isle of Man cabbage is *B. Monensis*. It grows wild on sandy soils, and is eagerly eaten by sheep and cattle.

Braun, August Emil, a distinguished German archæologist, was born at Gotha, 19th April 1809. In 1833 he went to Rome, where he became first librarian, then secretary, to the Archaeological Institute, and where he died, September 25, 1856. Of his numerous works may be mentioned *Il Giudizio di Paride* (Par. 1838); *Griechische Mythologie* (Hamb. and Gotha, 1850); *Griechische Götterlehre* (Gotha, 1851-55); and *Die Ruinen und Museen Roms* (Bruna, 1855).

Braunsberg, a walled town of Prussia, province of E. Prussia, on the Passarge, 40 miles S.W. of Königsberg by railway, has an old castle built in 1241, a Catholic college constituted in 1818, and several hospitals. It has an active trade, and is specially famed for its *Pillnawurst* beer. Pop. (1871) 10,471, of whom three-fourths are Roman Catholics.

Brauer or Brouwer, Adrian, a Flemish painter, born in 1608 at Haarlem, according to others at Oudenarde. His parents were poor, and gave him no education, but Nature had made him an artist, and from an early age he painted birds and flowers, which his mother sold to country-folks. Later on he became a pupil of Franz Hals, who possessed himself of B.'s pictures and sold them for his own benefit. B. effected his escape from his rapacious master, and at Amsterdam sold his works for large sums, which he squandered in low dissipation. He was generously befriended by Rubens, who highly admired his talents; and after B.'s death in the hospital of Antwerp in 1640, Rubens had his body disinterred from among the graves of the poor, and honourably buried in the Church of the Carmelites. The subjects of his pictures are taken from taverns and their inmates, and are put on the canvas with great truth and energy.

Bravi, an Italian term, the plural of *Bravo*, applied to persons who for hire undertook to assassinate and murder, though originally confined to persons indiscreetly daring.

Bra'vo, or **Rio Grande del Norte**, after the Mississippi the largest river which flows into the Gulf of Mexico, rises among the Rocky Mountains in Colorado, U.S., and has a course, generally south-easterly, of 1800 miles, serving through two-thirds of its length as a natural boundary between Texas and Mexico. It receives the large river Pecos from Texas, and the Salado and Conchos from Mexico. Owing to its shallowness, and the frequent occurrence of rapids and sandbars, it is of little use commercially.

Bravura (Ital.), a musical term applied both to a composition and to a style of performance. A B. composition is one consisting mainly of florid and intricate passages, runs, ornaments, &c. Even when written by a great musician, it possesses little interest except as a means of displaying the talents of a great singer.

Brawling in Church is by the law of England an offence against public peace. The Act 23 and 24 Vict., c. 32, abolishes the jurisdiction of ecclesiastical courts in England and Ireland in suits against any person not in holy orders for defamation and B. By the same Act, any person guilty of riotous or indecent behaviour in any church in England or Ireland, or in any churchyard, burial-ground, chapel, or place of religious worship duly certified, or who shall molest any preacher or minister authorised to preach therein, shall, on conviction before any two justices, be liable to a penalty not above £5 for every offence, or,

in default of payment, to two months' imprisonment. Offenders may be immediately apprehended after the offence by constable or churchwarden. Persons aggrieved may appeal to next quarter-sessions. To obstruct or assault a clergyman or other minister in the discharge of his duties is a misdemeanour, and any person convicted is liable to be imprisoned for any term not exceeding two years, with or without hard labour. See CHURCHYARD.

Brawn (Old Fr. *brâton*, 'a roll of flesh'), the designation of a male pig after it is weaned. A cut or castrated pig is called a *brauner*. The name B. is also applied to the flesh of swine freed from all bones, formed into a roll, seasoned with spices, and boiled: Wiltshire B. is much relished, and is particularly palatable in sandwiches.

Braxy, a fatal blood disease in sheep, produced chiefly from indigestion, inducing constipation, setting up acute inflammation in the bowels, whose ultimate and speedy result is death. The indigestion, according to the author of *The Book of the Farm*, is occasioned by a sudden change of food from succulent to dry; and on hill farms this is more easily discernible, on account of the snow in winter covering the grass upon which the stock had been feeding, necessitating their subsistence upon the tops of old heather and other plants growing on high altitudes. Mr Stephens recommends that the sheep should be provided with shelter, and turnips and hay given to them. The Ettrick Shepherd, James Hogg, in his *Sheep Guide*, says the loss of cud is the first indication of B. When the sheep stands, it brings its four feet into the compass of a foot, is restless, lying down and rising up in the space of a few minutes; the eyes are dull and heavy, the ears down-hanging, the tongue and mouth parched, and the belly distended to bursting. Hogs affected with B. frequently die between night and morning. In some parts of Scotland, the flesh of sheep suffering from B. is cured and hung up in the shielings, and is much relished as a article of diet. See Stephens' *Book of the Farm*, Clater's *Cattle Doctor*, Cowan's essay in *Transactions of the Highland and Agricultural Society*, 1863, Dick's *Manual of Veterinary Science*, and Williams' *Principles and Practice of Veterinary Medicine*.

Bray, a rapidly-rising watering-place on the E. coast of Ireland, just on the border line between the counties of Dublin and Wicklow, 13 miles S.E. of Dublin by railway. It may be said to have sprung into existence only of late years, but is already a flourishing town of fine villas, with many hotels and a large Turkish bath. Pop. (1871) 6087, being an increase of almost 50 per cent. over that of 1861.

Bray, Mrs Anna Eliza, an authoress of considerable repute and with keen artistic sympathies, was the daughter of the late Mr John Kempe, a gentleman of Cornish extraction, and was born in the end of last century. She has been twice married, first to Mr Charles Alfred Stothard, an artist, who was killed, May 1821, by a fall from a ladder, and secondly to the Rev. E. A. B., vicar of Tavistock. She has published memoirs of both, a variety of works on art and music, and a large number of historical romances, beginning with *De Foix* (1826), and ending with *Joan of Arc* (1874).

Bray, Edward Atkyns, B.D., F.S.A., husband of the preceding, was a poet and theological litterateur, and was born at Tavistock, Devonshire, 18th December 1788. He studied at Cambridge, and was called to the bar in 1806. But law not proving congenial, he took orders, and obtained the vicarage of Tavistock, where, after an industrious literary career, he died, 17th July 1857. B. wrote *Arcadian Idylls*, *Lyric Hymns*, *Discourses on Protestantism*, and published a variety of selections from eminent divines. His *Poetical Remains*, *Social, Sacred, and Miscellaneous*, with a memoir, were edited by his widow (2 vols. Lond. 1859).

Brayera. See CUSO.

Brazil (Fr. *Brésil*, named from the colour of its dye-woods; Port. *brasa*, 'a live coal'), an empire, and the largest and most populous state of S. America, comprehending one-fifteenth of the terrestrial surface of the globe, and extending between lat. 4° 30' N. and 33° S., and between long. 35° and 70° W. Its greatest length from N. to S. is 2600 miles; greatest breadth from E. to W., 2500; while it has a coast-line of 3600 miles. The areas,

divisions, and populations, according to the *Almanach de Gotha* for 1876, were as follows:—

Provincia.	Area.	Populations.	Slaves.
Amazonas	753,470	57,610	979
Pará	412,464	859,821	27,199
Maranhão	141,651	359,040	74,939
Piauí	81,779	202,222	23,795
Ceará	50,262	721,686	31,913
Rio Grande do Norte	20,130	233,979	13,020
Parahyba	20,346	302,557	20,914
Pernambouc	46,257	841,539	89,028
Alagoas	11,642	348,009	35,741
Sergipe	12,035	161,307	21,495
Bahia	204,802	1,283,141	168,295
Espírito Santo	17,030	82,137	22,659
Rio de Janeiro	18,490	727,576	270,726
Município Neutro		274,972	48,939
S. Paulo	90,541	837,354	156,610
Paraná	108,557	126,722	10,562
Santa Catharina	18,024	159,802	14,984
Rio Grande do Sul	110,215	430,878	66,876
Minas Geraes	237,482	2,009,023	366,574
Goyaz	263,335	160,395	10,652
Matto Grosso	668,653	60,417	6,667
Total	3,298,065	9,700,187	1,476,567

The population is composed of Portuguese, Creoles, English, Germans, Swiss, Chinese, and aborigines.

Physical Aspect, &c.—B. is mountainous over about one-third of its surface. There are vast plains in the N. and S., and the interior rises into extensive plateaux. The three great mountain chains are (1) *Serra do Mar*, on the E. coast, with peaks from 4000 to 5000 feet high; (2) the *Serra do Espinhaço*, the middle range, forms the E. border of the Diamond plateau (*Minas Geraes*), and has peaks of over 7000 feet; and (3) the *Serra dos Ventos*, the western watershed, which diverges into many broad but low ramifications in the N. and N.W. An immense tract of B. in the N. belongs to the basin of the Amazon, partly consisting of grassy plains (*Llanos*), and partly of marshes (*Séguas*). There are two vast river systems—the Amazon in the N., with nineteen great tributaries; and the La Plata in the S., formed by the union of the Parana and Paraguay, both of which have their head-waters in B. The only other streams of note are the San Francisco and Parahyba. The navigation of these rivers is seriously impeded by cataracts and shallows, but the Government since 1865 has diligently striven to remove such obstacles, and has organised (1873) nearly 12,000 miles of internal steam navigation. The climate, in the mountainous regions, and where temperature is affected by the sea-winds, is mild, but in the low plains and on the banks of rivers is tropically hot and unhealthy. There is much intermittent fever during the rainy season, which occurs in our winter time.

Zoology, Botany, and Mineralogy.—The Brazilian fauna is extremely rich, and its flora is one of the most wonderful in the world. The principal animals are the jaguar, wolf, tapir, deer, paca, wild boar, armadillo, and many varieties of the monkey. Of birds, there are quails, partridges, pigeons, vultures, owls, mocking-birds, parrots, and other birds of brilliant plumage. Tortoises, alligators, boas, and rattlesnakes are among the common reptiles. Everywhere, on the other hand, the most vigorous vegetation is exhibited, giving the appearance of a perpetual spring. More than 17,000 botanical species are already known, of which the most important are the famous B.-wood (q. v.), valuable alike for shipbuilding, cabinetmaking, and dyeing. The carnauba palm is a vegetable wonder. Every part subserves some important use, and from the leaves is extracted a kind of wax employed in candle-making, to the value of above £150,000 annually. The mineral treasures comprise diamonds, emeralds, euclases, sapphires, rubies, topazes, tourmalins, garnets, gold, silver, copper, lead, bismuth, iron, mercury, and manganese. Throughout B. there are abundance of mineral waters.

Commerce, Railways, &c.—The commerce of B. has greatly increased since the opening of the ports to all friendly nations in 1808. With the view of developing the resources of the country, the Government has allowed to foreign merchants the right of navigating the rivers and of coasting. The exports are coffee, representing by itself nearly the half of the whole value; cotton, a rapidly increasing staple since the civil war in America;

sugar, also rapidly increasing; dry and salted hides, caoutchouc, tobacco, maté or Paraguay tea; cacao, rum, manioc flour, gold, diamonds, &c. The exports for 1874 amounted to £3,508,473, and the imports £9,793,669. The railway system of B. is being largely developed, the Treasury having spent in 1871-72 £1,167,528 on this item alone. The completion of the systems now projected will place the capital of the empire, Rio de Janeiro, at only a few days' distance from the greater part of the central and northern provinces, and will open up vast territories, fertile and healthy, to the enterprise of the colonist. In 1873 upwards of 700 miles of railway were in the course of operation; but the construction of at least two lines has in the meantime been abandoned for want of funds. In 1874 there were considerably more than 3000 miles of telegraph lines, and in that year a transatlantic cable was laid connecting B. with Europe.

Government, Education, &c.—The executive authority is vested in the Emperor, who acts through his ministers. The Senate consists of 58 members elected for life, and the Chamber of Deputies of 122 members, elected for four years by the free population. The financial year of 1871-72, of which a definite account was rendered to the Chambers 8th May 1874, showed the revenue to be £12,976,825, and the expenditure £10,158,677. The public debt on March 31, 1874, was £61,688,782. The established religion is the Roman Catholic, but all other religions are tolerated. For administrative purposes B. is divided into twenty provinces, and the ecclesiastical jurisdiction is exercised in twelve dioceses. Education is being promoted both by Government and by private efforts, and there are night-schools for adults both in the capital and in several provinces. Normal colleges have been instituted, and popular libraries, public and private, have been established. The army for 1875 was fixed at 16,000 men; the national guard, including the reserve, was 741,782 men; and the naval force consisted of 61 ships, with 30 companies of marines, numbering 4136 men.

History.—B. was discovered in May 1500 by the Portuguese, but they founded no settlement till 1531. In 1549 they sent out the first governor, who founded the town of Bahia, where he established a regular administration. In 1578 B. was conquered by Spain, and subsequently by the Dutch Republic, which retained possession of it till 1654, when it was recovered by the Portuguese. In 1808 the troubles in the Peninsula induced the royal family of Portugal to transfer themselves to Brazil, which was raised to the rank of a kingdom. On September 7, 1822, it was declared an independent state, of which the sovereign adopted the title of emperor, and a constitution was published 25th March 1824, modified by the additional Acts of 12th August 1834 and 12th May 1840. In 1871 a law was passed by which children born of slaves were declared free, as also were all slaves in the imperial and public service. See Kidder and Fletcher, *B. and the Brazilians* (Philad. 1866), Baril de la Hure, *L'Empire de Brésil* (Par. 1862), Von Varnhagen, *Historia geral do B.* (Rio de Janeiro, 1855), Captain R. F. Burton, *Highlands of B.* (2 vols. Lond. 1869), and Stein and Hörschelmann, *Handbuch der Geographie und Statistik* (Leips. 1871).

Brazil Cabbage, or Chou Caralbe (*Caladium sagittifolium*), a plant of the natural order *Araceæ*, allied to Cocco (q. v.), a native of tropical America, but now cultivated for the sake of the root, which is eaten like cocco, and the leaves, which are boiled like greens.

Brazil Grass, a commercial name for the strips of the leaves of a palm, *Chamarops argentea*, imported chiefly from Cuba for the purpose of making cheap chip or B. G. hats.

Brazil-Nuts are the seeds of *Bertholletia excelsa*, a very lofty tree growing throughout Brazil, Guiana, and tropical America generally. The seeds, termed nuts, are enclosed within a hard woody cap-



Flower, Leaf, and Section of B.-N. Fruit.

sule, closely packed together, the whole fruit forming a ball considerably bigger than an orange. The kernels are also enclosed within a hard nutshell, and present the appearance of segments of a circle, the diameter of which would average two inches. Besides being consumed as food in enormous quantities, the seeds by pressure yield a valuable oil of a pleasant nutty flavour, and is used in cooking. The oil contains 74 per cent. of elaine and 26 per cent. of stearine. Each pound of kernels yields about 9 oz. of oil, which is worth in Brazil 2s. per lb.

Brazil-Wood, the name of several trees of the genus *Cesalpinia*, belonging to the natural order Leguminosæ, found in Brazil and tropical America. The wood, when newly cut, is yellow, but rapidly assumes a deep red colour; it is very hard and heavy, and of great value as a dye-wood. The wood contains a colouring principle termed Brazilin, which has been isolated by M. Chevreul. The dyeing solution is prepared by reducing the wood to powder in a mill, and extracting the colouring matter by the action of boiling water. The strained residue is repeatedly heated with boiling water, to which an alkali may be added with advantage. The solution gives a bright crimson colour on wools and silks, with an alum mordant, but the colour is not very permanent. On cotton, with a mordant of tin crystals, it yields several shades of red according to the method of treatment; but it is not commonly used in conjunction with other tinctorial agents. Varieties of B.-W. are imported under the names of Nicaragua-wood, Lima-wood, peach-wood, and Pernambuco-wood. See also SAPAN-WOOD.

Brazilian Plum. See HOG PLUM.

Bra'zing denotes the art of soldering or uniting the edges or surfaces of brass or copper by means of an alloy more fusible than the metals operated on, and composed of copper and zinc in varying proportions, sometimes with a small percentage of tin. *Soft spelter* solder, commonly used for ordinary brass work, is composed of equal parts of copper and zinc, and *hard* solder contains two parts of the former metal to one part of the latter. The process of soldering requires that the surfaces to be joined be thoroughly cleaned, which is accomplished by filing, and to prevent the oxidation of the metals, Borax (q. v.) is mixed with the alloy. The mixture of borax and solder in the state of a coarse powder is applied in a wet state; gentle heat drives off the moisture and fuses the borax, while a bright red heat fuses the solder, which on cooling joins the surfaces firmly together.

Brazos de Dios, an important river of Texas, U.S., flowing in a south-easterly direction from its source in Bexar county to the Gulf of Mexico, a distance of 900 miles. It is always navigable for 40 miles from its mouth, sometimes for 300 miles. Its valley is rich and fertile, but is still largely covered with primeval forests.

Brazza, an Austrian island in the Adriatic, the largest of the Dalmatian group, is separated from the mainland by a channel from 8 to 10 miles broad, and has a superficial area of 140 miles. Its wines are noted in the district (especially the *Vulgava* wine); and figs, almonds, and oil are also abundant. Bees and silkworms are reared, and there is a large export trade in building-stone. B. has good harbours. Pop. 15,980. The chief town is San Pietro.

Breach. See SIEGE-WORKS.

Breach, in law, means a violation of law. It has several special applications, of which the following are the most important:—

B. of Arrestment is, in Scotch law, the contempt of law committed by an arrestee who pays the sum, or delivers the goods arrested, to the common debtor. The arrestee is liable in damages to the value of the money or goods paid or delivered, with expenses. When goods are arrested, and the arrestment loosed on security, if the goods cannot be restored or their value ascertained, the surety, or 'cautioner,' is liable for the debt. See ARRESTMENT.

B. of Close means, in English law, the unwarrantable entering upon another man's property. The owner will be entitled to damage adequate to the injury. If cattle commit B. of C., their owner is answerable. In certain circumstances, however, the trespass is justifiable. It is so where one comes to demand or pay money due in the place entered, or there to execute legally any process of law. One may also legally enter an inn or similar

establishment without leave of the owner. But misconduct, or refusal to leave in proper time, is held by the law to constitute B. of C. from the moment of entry. See TRESPASS, BREAKING ENCLOSURES.

B. of Covenant renders the maker of the covenant and his representatives liable to an action. See COVENANT.

B. of Contract renders the breaker liable to action under the Common Law Procedure Act, or in the Courts of Equity. See CONTRACT.

B. of Duty may be either an offence of commission or omission; and the neglect of any action which the common sense or natural instinct of mankind points out as incumbent on any one may constitute the offence, and render the offender liable in civil or even criminal action. Thus, parents who neglect their children in serious illness may be held guilty of homicide, or even of murder.

B. of Peace.—Any offence against public safety or tranquillity is so called. See PEACE, OFFENCES AGAINST THE PUBLIC.

B. of Pound, in English law, means the breaking of any Pound (q. v.) where stray cattle are impounded, with a view to their illegal release. Stray cattle may be impounded according to law, in security of any damage which they have occasioned. The penalty of B. of P. is £5 with costs; failing payment, imprisonment with hard labour.

B. of Promise. See PROMISE.

B. of Promise to Marry. See PROMISE.

B. of Trust.—In ordinary language, one may be said to commit a B. of T. who, as trustee, acts contrary to law; but the term in law is only applied to acts in violation of the law of trust, done with intent to defraud. (See TRUST, TRUSTEE.) The distinction between B. of T. or embezzlement and the higher crime of theft is often exceedingly narrow. In Scotland, the principle has been adopted and enforced that where a person holds property without any right of administration, and is bound to hand over that property in specific form, appropriation by that holder is theft. On the other hand, when the holder has a right of management, or power, to exchange or to account for the property, or to give an equivalent, the appropriation of that property, or its proceeds, constitutes only the minor crime of B. of T. The appropriation by a watchmaker of a watch left with him to be cleaned and repaired was held to be *theft*; but appropriation by a pawnbroker of an article pledged has been held only as B. of T., on the ground that by lapse of time his title to the article pledged becomes absolute, and so gives him the right to sell. For a very curious question of stealing or not stealing, see the case of *Middleton*, tried before the Central Criminal Court, 23d September 1872. The Act 24 and 25 Vict., c. 96, is directed against 'frauds by trustees, bankers, directors, and others.' It specifies and defines various crimes and misdemeanours connected with fraudulent appropriation of property, and with the falsification of books and accounts, and inflicts penalties on these. See EMBEZZLEMENT.

Bread, an important and universal form of food, made by kneading the flour or meal of cereals with water into a tough and consistent paste, and baking it. The paste is generally rendered light and vesicular by gaseous carbonic acid, either evolved within the paste by employing a ferment, or introduced into it by artificial means. The earliest kind of B. was unvesiculated, and simply consisted of raw grain softened with water, pressed and baked. Cakes and analogous forms of this primitive unfermented B., made, however, with bruised grain, still constitute the principal kind of B. used by the rural population of Scotland, as well as by the inhabitants of Northern Europe, and many other parts of the globe. (See BANNOCK and BISCUITS.) Although all the cereal grains are employed more or less for B.-making in the countries where they are cultivated, only one of them—namely, wheat—is well adapted for the formation of good vesiculated B., and accordingly it is most extensively used for that purpose. There are numerous varieties of Wheat (q. v.), all containing, in slightly varying proportions, the same proximate principles, chiefly starch, nitrogenous matter, fat, and inorganic salts. The nitrogenous matter consists chiefly of gluten, a substance which gives wheat its pre-eminence over other grain for B.-making. If a small quantity of wheaten flour be placed in a linen bag and squeezed under water, the starch dissolves and passes through the bag, leaving the gluten behind. Gluten is then seen to be a grey, viscid, tena-

cious, elastic substance, and chiefly consists of vegetable fibrin. It has also adhesive properties, due to a small quantity of a peculiar azotised matter called *gliadin*. Other kinds of grain yield vegetable fibrin, unaccompanied, however, with gliadin, or associated with it to so small an extent that the elasticity and tenacity which characterise gluten, and cause it to retain carbonic acid within a paste of wheaten flour, thereby communicating lightness and porosity, are totally or nearly altogether absent.

Wheat for B.-making is first ground by being passed between two millstones, in order to detach the white, friable, starchy, and glutinous portion of the grain from its hard tegumentary coverings. The product of the attrition is meal, which contains all the elements of the grain; and to obtain the starchy powder, or flour, the meal is bolted or dressed in a hollow cylinder, which is covered with wirecloth of varying degrees of fineness, and placed in an inclined position. Within this cylinder hair brushes are fixed to a rotating rod in the axis of the cylinder, and when the meal is introduced at the raised end, the brushes force the flour, according to its fineness, through the meshes of the gauge. Dressing thus yields flour of different qualities, called *firsts*, *seconds*, and *thirds*; and the husky particles that pass out at the low end of the cylinder are again sifted, and form, according to fineness, pollards, sharps, and bran. Fine flour, or firsts, is used for B. of a superior quality to the ordinary or household B., which is made of seconds and thirds of variable proportions. Dr Letheby gives the composition of flour as follows:—

Nitrogenous matter	10.8
Starch, dextrin, &c.	70.5
Fatty matter	2.0
Mineral matter	1.7
Water	15.0
	100.0

Loaf-B., or ordinary fermented B., has a firm porous texture, induced by *panary* fermentation by means of leaven, yeast, or other ferment, which converts a portion of the starch of the flour into dextrin and grape-sugar, and splits up the latter into alcohol and carbonic acid. (See FERMENTATION.) If a mixture of flour and water be kneaded into a stiff paste or *dough*, and laid aside in a warm situation, decomposition ensues. The dough in this active condition is called *leaven*, and if kneaded with a large quantity of flour and water, it sets the whole mass into active fermentation, rendering it light and spongy by the evolution of carbonic acid. Leaven was employed in remote times, and is still used in Germany and France in B.-making. Its uncertain action, however, has led English bakers to adopt Yeast (q. v.) as a substitute. There are various kinds of yeast—brewer's yeast or barm, German yeast, and *patent* yeast, prepared by fermenting a little hops and malt with brewer's yeast, and adding boiled and mashed potatoes and flour.

In the manufacture of fermented loaf-B., the baker first takes small quantities of tepid water, yeast, and salt, and proceeds to knead some flour with them. The *sponge* so formed is then set apart in a warm place till fermentation ensues, and the mass rises and falls with the evolution and escape of carbonic acid. When the action has proceeded far enough, the remainder of the flour, salt, and water necessary to make the proper amount of dough is laboriously and intimately kneaded with the sponge, and the whole again laid aside for some time, during which the fermentative action permeates the mass of dough, and increases its bulk by the formation of innumerable bubbles of carbonic acid. A second kneading operation gives a uniform consistence, and distributes the carbonic acid equally throughout the mass, therefore preventing it from becoming *sad* or ill raised. The dough is then shaped into loaves, and during the short time that elapses before their introduction into the oven, each loaf swells up, or gives *proof*. On being baked by exposure to a high temperature in an oven for an hour, the expansion of the confined gas within the loaves still further increases their bulk, so much so, that on being withdrawn from the oven, they are twice as large as when they entered it. The heat of the oven stays the fermentative action and expels the alcohol thereby formed. One important duty of the baker is to check the fermentation at the proper point, for if it is carried too far it leads to acetic fermentation, rendering the B. sour and unpalatable, and if not prolonged enough the dough does not rise sufficiently. Flour, in being converted into B., in-

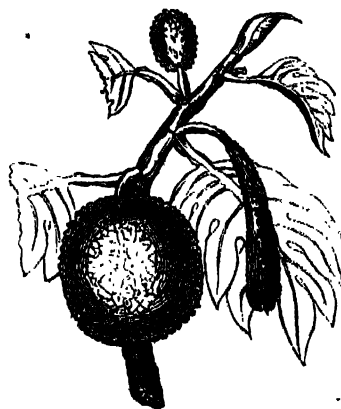
creases considerably in weight by absorption of water, and it is found that one cwt. of flour yields about 140 lbs. of B. In the baked loaf, the starch, though swollen, remains unaltered in the crumb, and in the crust is transformed into dextrin. A dark colour is imparted to the crumb of the loaf when too much starch is converted into dextrin and sugar, which in course of fermentation always takes place in a slight degree. Advantage is often taken of the property possessed by alum of hindering this change to render inferior flour, which is much more susceptible of it than fine flour, suitable for B.-making, and, by adding alum in sufficiently large, though deleterious, quantity, a loaf may be manufactured from deteriorated flour rivaling in whiteness that made from the finest flour. Salt, while it flavours B., gives whiteness and firmness to it. Yeast, leaven, or other ferment, is not essential to the formation of good vesiculated B., for lightness and porosity may be imparted by means of effervescing compounds. For instance, B. of fairly good quality is made by mixing a little hydrochloric acid and carbonate of soda in the dough unflavoured by salt; when the proper proportions are taken, the acid is neutralised by the alkali, common salt (chloride of sodium), and carbonic acid being formed, the dough is flavoured and changed by charging it with vesicles. Carbonate of ammonia is also sometimes employed to lighten the dough, being completely volatilised by the high temperature of the oven—the apparently objectionable qualities, strong taste and pungent smell, of the substance being in no wise imparted to the dough. (See AERATED B.) Brown B., which is made of coarse wheaten flour, owes its colour to a peculiar nitrogenous body closely allied to diastase, called *cervalin*, which was discovered and described by M. Mège-Mouriès, and is present in largest quantity in the external portions of the wheat-grain. Brown B. is commonly thought to be more nutritious than white B., but is in reality not so. Its laxative property arises from the indigestible particles of the cuticle of the grain acting as a mechanical irritant on the alimentary canal. See NUTRITION and FOOD.

Breadalbane (Gael. *Braidalbainn*, 'the hill country of Albainn') is one of the old stewardries of Perth, and lies in the W. part of the county. The district known by the name is about 33 miles long and 31 broad, reaching from Lochaber and Atholl on the N. to Strathcarron and Menteith on the S. It lies in the heart of the Grampian mountains, has no towns, and few villages. Loch Tay is the principal sheet of water. It gives the title of marquis to a branch of the Campbells, to whom nearly the whole of B. belongs.

Bread, Army. The B. now supplied to the regiments of the British army is baked at the encampment or barracks where the regiment is quartered, by duly qualified persons. The wholesomeness of the B. is thus ensured; and even when, in certain cases—e.g., when the detachment is small—the B. is supplied by contract, it is subjected to a strict supervision before it is used. Formerly all the A. B. was supplied by contract; but a few years ago it was discovered that the A. B. was of such wretched quality that a reform was necessary, and accordingly, after several experiments, the present system was adopted.

Bread-Fruit Tree

(*Artocarpus incisa*), a tree of the natural order *Artocarpaceæ*, a native of the islands of the Pacific and of the Indian Archipelago, the fruit of which supplies a great portion of the food of the natives of these islands, while the bark is used for clothing, the timber for canoes, house-building, furniture, &c., and the milky juice, which exudes when the bark is punctured, is, when boiled with cocoa-nut oil, employed as birdlime, and for making the seams of canoes and various



Bread-Fruit.

domestic vessels water-tight. The fruit is about the size of a child's head, and is gathered before it is fully ripe. It is cooked by being baked in an oven, or the fruits are allowed to ferment, and then beaten into a paste, which is sourish, but will keep for some time. There are several varieties of B.-F., ripening at different seasons. It has been introduced into S. America and the W. Indies, and it may be remembered that the mutiny of the *Bounty*—so famous in sea-story—happened in the course of a voyage to introduce the B.-F. into the Antilles. In these islands it is, however, not so much valued as the plantain. The *Jak*, *Yacca*, or *Jack-Fruit* is *A. integrifolia*, and is largely used as food by the natives of Ceylon, Southern India, and other parts of tropical or semi-tropical Asia. The seeds when roasted are also much esteemed, and the timber is much used for furniture. The inner wood (*duramen*) is used to dye the robes of the Buddhist priests of a yellow colour. The *Dephal* (*A. Lakoocha*), a native of the E. Indies, is another member of this genus.

Bread-Nuts, the edible seeds of *Brosimum Alicastrum*, which belongs to the same order as the Bread-Fruit (q. v.). The wood is somewhat like mahogany, and in Jamaica is used by cabinetmakers. The leaves and young shoots are eaten by cattle, but become deleterious when old. The beautiful mottled heart-wood of *B. Aubletii* (the letter-wood, snake-wood, or leopard-wood of Trinidad and British Guiana) is used for veneering and for making walking-sticks.

Bread-Room, as a nautical term, means the place where the biscuits are stored. In the Navy it is carefully constructed, and kept as warm and free from damp as possible.

Bread-Root. See PSORALEA.

Bread-Tree. See CAFFRE-BREAD.

Breakers are waves that break or fall over, on account either of the shallowness of the water, or of rocks a short distance under the surface. Their foam and roar are sharply looked after and listened for at sea, on account of the danger they indicate. In a gale the tops of the seas break, owing to the progressive motion of the water at the surface before the wind. This is very dangerous for open boats.

Breaking Bulk, a Scotch law term, signifying the making use of an article bought, by which the buyer is debarred from afterwards objecting to the article and returning it to the seller.

Breaking Enclosures, a term in the law of Scotland somewhat analogous to that of Breaking of Close (q. v.) in that of England. Several old Scotch Acts are designed specially for the encouragement of planting and enclosing. They inflict penalties on persons or their cattle found guilty of trespassing on the lands so protected. By common law, also, injuries done to trees and enclosures are punishable as malicious mischief.

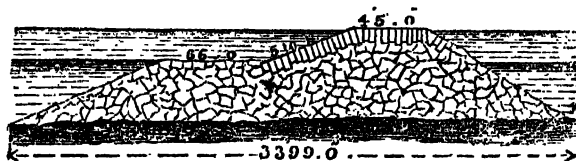
Breaking Joint is an arrangement used in construction in iron and other materials, analogous to Bonding (q. v.) in brick-work and masonry. The phrase implies that the joints in contiguous strakes, or layers of plates, should not be in line with, or over each other, in order that the structure may be as little weakened by them as possible.

Breaking of Prison is the crime of escape by one lawfully imprisoned, whether effected by violence or by corruption. The punishment is arbitrary.

Breakstone, an old name for the *lady's mantle* (*Alchemilla vulgaris*), derived from the popular belief in regard to its action in stone and gravel. It is somewhat tonic and astringent.

Breakwater, a structure built to shelter a harbour or roadstead from the action of the waves, and thus to provide safe anchorage for vessels. Breakwaters may be entirely cut off from the shore, across the entrance of a bay, as at Plymouth; but frequently they resemble piers in having one end connected with the land, as at Holyhead. They may be divided into two classes according to their construction: they are either walls of solid masonry or concrete, with nearly vertical faces, which reflect the waves, or else are broad mounds of stone, with long and gently-inclined seaward faces, upon which the waves break. To the former

class belongs the B. now in course of construction at Dover, and the new South B. completed in 1873 at Aberdeen. The Dover B. is of ashlar masonry filled up with Concrete (q. v.). The work is carried on with diving-bells, and has proved exceedingly difficult and expensive. The Aberdeen B. had its foundation made by depositing *in situ* large bags of liquid concrete, which hardened rapidly under water. The surface of these bags was prepared by helmet-divers to receive the superstructure, which, up to low-water level, consisted of concrete blocks weighing about 20 tons each. The upper part of the B. is concrete also, and was deposited liquid in cases, holding hundreds of tons each. Finally bags, each containing 100 tons of liquid concrete, were deposited as an 'apron' round the foot of the B. The engineer of this structure was Mr W. Dyce Cay. Among the best-known breakwaters of the other class are those of Plymouth, Portland, Cherbourg, and Holyhead. The latter was designed by the late Mr J. M. Rendel; the necessary Act of Parliament was passed in 1847, and the B. was formally declared complete by the Prince of Wales in August 1873, although the partially-formed harbour had proved itself of great value to shipping long before that date. This gigantic structure consists of a mound of rubble 7860 feet long, and 400 feet broad at the base, the depth of water (spring tides) being over 50 feet. The mound is surmounted near its inner side by a massive masonry wall about 40 feet high, on the harbour side of which is a lower terrace, or quay wall, that may possibly be used for



wharfage at some future time. The mound contains about seven million tons of stone (obtained from quarries close at hand—see BLASTING), and the whole B. cost about £1,285,000, or about £163, 10s. per foot run.

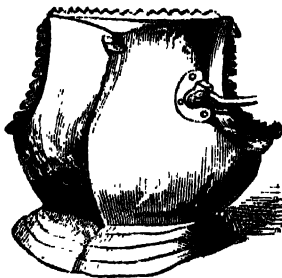
Bream, a name applied popularly, and without scientific or plausible reason, to various different genera of fishes. The B. proper of ichthyologists is a fresh-water Teleostean fish, belonging to the *Cyprinidae* or carp family, and scientifically known as *Abramis brama*. It is occasionally known as the 'carp B.' The B. genus *Abramis* is nearly allied to the *Cyprinus* or carp genus, but the members of the former group possess compressed bodies, convex in outline above and below, and are not provided with spiny rays in the dorsal and anal fins. No barbules surround the mouth. The common B. is found in most European lakes and slowly-running rivers. It is plentiful in the Cumberland Lakes. It is yellowish white in colour, the cheeks and gill-covers being of silvery hue. This fish may attain a weight of 14 lbs. The flesh is not very rich, although it was formerly accounted a savoury article of diet. Chaucer's *Frankelene*, who was 'Epicurus' owne sone,' had 'many a breme and many a luce in stewe.' The white B. (*A. blicca*) is of a uniform silvery or greyish colour, and resembles the common B. in its distribution. A species named the Pomeranian B. (*A. Buggenhagii*), occurring chiefly in Pomerania, but also in Britain, has a thicker body than the common B., larger scales, and the tail less acutely forked. The name sea-B. has been variously applied to the genus *Brama* (q. v.), belonging to the family *Chatodontidae*; to the genus *Pagellus* or *Sparus*, belonging to the family *Sparidae*; and to the Gilt-head (q. v.) (*Chrysophrys aurata*) of the latter family.

The carp B. is most frequently caught by anglers, and is caught in much the same way as Barbel (q. v.). The bait consists of red worms or lob-worm. The B. spawns about the end of May or beginning of July, and seems generally to inhabit deep holes, and clay or sandy bottoms. These fishes frequently approach the surface of the water.

Breaming, a nautical term, used to denote the cleaning of the bottom of a ship by fire. The ship is laid aground, and fire is applied to the bottom, which loosens the pitch, or composition of sulphur and tallow, with which it is covered to pro-

tect it from worms. This is then scraped off, along with the barnacles, grass, weeds, and other filth which are found adhering to it.

Breastplate, a plate of iron, steel, or other metal, worn upon the breast in former ages as a piece of defensive armour.



Breastplate.

There was also a backplate to protect the back. See CUR-RASS.

Breasts (*mammæ*) are the glands which secrete the milk in the human female. They are two in number, and are placed in front of the chest, one on each side. They are conical in shape, and at the summit have a prominence called the nipple. The skin around the nipple is darker, and is covered with sebaceous glands. This coloured circle (*areola*) round the nipple is of a

rosy pink in the virgin, but during pregnancy, and during lactation, is much darker, and never afterwards fully regains its original rosy hue. The B. exist also in the male, but only in a rudimentary state; even in the female they are in infancy only rudimentary, and develop as she approaches puberty. They increase much during pregnancy, and atrophy or become small in old age.

Structure of B.—They are glands divided into distinct lobes, each lobe having a separate duct, called milk-bearing ducts. These are from 15 to 20 in number; they converge towards the nipple side by side without communicating with each other, and open on the surface of the nipple by separate openings.

The B. are liable to certain diseases. They are a common seat of several tumours, as fatty, fibrous, and very specially of *Hard Cancer* (q. v.). These tumours require to be removed with the knife. The B. are liable to inflammation, often going on to suppuration and formation of abscess. This generally begins with shivering, pain in the B., heat and swelling in the part, and great disturbance of the general health. The treatment consists in hot poultices or fomentations, and opening early to relieve pain. When an abscess forms, it is to be opened with a free incision.

Breast-Wheel, a vertical water-wheel in which the water enters the buckets at some little distance below the highest part of the periphery, and which is fitted with a casing, or *breast*, extending downwards from the point where the water enters to the tail-race, nearly fitting the outside of the wheel, and so preventing the water leaving the buckets too soon.

Breastwork, in fortification, is a mass of earth raised to protect troops against the fire of an enemy. It is generally not so high as to require a banquette for the defenders to stand on when they fire over its crest.

Breath and Breathing. See RESPIRATION.

Breath, Offensive, may arise from many causes, and treatment will depend very much upon the cause of the B. O. It often arises from a decaying tooth. This odour is most offensive. It may arise from particles of food lodging in a decaying tooth and becoming putrid. In both cases great care must be paid to cleanliness, either having the stump extracted or all decaying matter carefully washed out from time to time. B. O. may arise from ulcers of the mouth, nose, or throat. In all such cases benefit will be derived by gargling the mouth well with chlorine water, charcoal, Condy's fluid, or some other disinfecting agent. B. O. is sometimes due to disease of the lungs, as gangrene, or abscess of the lungs. In such cases, small doses of turpentine internally will greatly benefit the patient. When B. O. is due to indigestion, purgatives, combined with proper attention to diet, and giving such medicines as charcoal or sulphite of soda internally, will do much to remove the B. O.

Breccia, a number of *angular* fragments of any hard rock, cemented into a compact mass by carbonate of lime or any other enveloping medium. When the fragments are *rounded*,

the mass is called pudding-stone. They show no trace of magnetism, but take on a fine polish.

Breche-de-Roland, a narrow pass of the Pyrenees between France and Spain, about 20 miles S. of Bayonne, and 9500 feet above the sea. It takes its name from the famous nephew of Charlemagne, who was slain at Roncesvalles by the Biscayans while leading the rearguard of the Frankish army back from Spain.

Bre'chin, a town of Forfarshire, on the S. Esk, 5 miles W. of Montrose by a branch railway, has considerable linen-weaving, flax-spinning, bleaching, distilling, and brewing. It is an old town, and was the seat of a Culdees house in the 10th and 11th centuries, and subsequently of a bishopric, founded by David I. in 1150. A portion of the cathedral, dedicated to St Ninian, is now the parish church, which contains a beautiful Gothic window. Near the church is a singular tower, 85 ft. high, 25 in diameter at the base, and 12½ at the top, crowned with a spire of 25 ft. It is like the Irish round towers, and is the only specimen of the kind in Scotland besides that at Abernethy. B. was formerly a walled town, and was burned by Montrose in 1645. It was defended by a strong castle, which stood a siege of twenty days before being taken by Edward I. in 1303. This was the seat of the Maule family, now represented by the Marquis of Dalhousie, and which has been rebuilt on the ancient site. Gillies, the historian of Greece, Maitland, author of the Histories of Edinburgh and London, and Dr Guthrie, the celebrated pulpit orator, were born at B. Along with Montrose, Forfar, Arbroath, and Bervie, B. returns one member to Parliament. Pop. (1871) 7959.

Brecknock (Welsh, *Brecheinog*), the county town of Brecknockshire, S. Wales, beautifully situated at the confluence of the Usk, Honddu, and Tarell, 50 miles N.E. of Bristol, with manufactures of coarse woollens, flannels, hats, and hosiery. It is now one of the railway centres of S. Wales, and a place of growing prosperity. It was founded in 1094 by a Norman adventurer, Bernard Newmarch, who here built a castle and two priories, one of which was converted by Henry VIII. into a college, restored in 1864. An Independent college was also founded here in 1867. B. lies at the N. base of the Beacon. The town was formerly surrounded by a wall and a moat. It is the birthplace of Dr Hugh Price, founder of Jesus College, Oxford, and of Mrs Siddons, the famous actress. B. returns one member to Parliament. Pop. (1871) 5845; of parliamentary borough, 6308.

Brecknockshire, a county of Wales, in the basin of the Usk, with an area of 719 sq. miles, or 460,158 acres, and a population (1871) of 59,901. It is in great part mountainous, abounds in picturesque scenery, and is watered by the Wye, Usk, Yrfon, Claerwen, and Tawe. The Black Mountains extend along the S., and have their greatest height in the Beacon, 2685 ft.; while in the N.W. rises the lower range of the Mynydd Eryn. In the N. and W. the formation is Silurian; all the rest is Devonian. The quality of the soil varies greatly, and only about a half of it is cultivated, the products being chiefly oats, barley, and wheat. There is much pasture, and a considerable trade in wool, butter, and cheese. B. is rich in minerals, the most extensively wrought being iron, coal, lead, copper, and limestone. The only considerable manufactures are coarse woollen cloth and worsted hosiery. Three main lines of railway intersect the country, and the B. Canal stretches to the Bristol Channel. Among the chief towns are Brecknock, Builth, Crickhowell, Hay, and Llanely. Welsh is the language of nearly half the inhabitants. The county returns one member to Parliament. In ancient British times B. was inhabited by the Silures, of whom it still retains many memorials in cromlech, mound, and cairn. There are also many remains of Roman camps and roads.

Bre'da (Dutch, *Brède*, the flat meadow-land; the word is the same as the Eng. *broad* and the Ger. *breit*), a strong town of N. Brabant, Holland, at the confluence of the Merk and the Aa, with a Gothic cathedral and an old castle, rebuilt in 1696 by the Prince of Orange, then William III. of England. It was for a time occupied by Charles II. while in exile. B. has manufactures of linen, carpets, leather, &c., and breweries and dye-works. Although it has lost much of its military importance, it

still possesses the means of laying the adjacent country, which is flat and marshy, under water. It came into the possession of Spain in 1567, and, after numerous vicissitudes of fortune, was in 1813 surrendered by France to the House of Orange. Pop. 15,282. B. was the scene of two congresses—(1) that of 1566, in which the Dutch nobles demanded from Spain the abolition of the Inquisition and of persecution for religion; (2) that of 1746-47, when France, England, and Holland met to arrange terms of peace. Both proved failures. The *Peace of B.*, 31st July 1667, ended the naval war in which England, France, Holland, and Denmark were embroiled through commercial jealousies.

Bre'sdow, Gabriel Gottfried, a German historian, born at Berlin, 14th December 1773, educated at the Joachimsthal Gymnasium and at Halle, and in 1796 became schoolmaster at Cutin. Here he devoted himself with great earnestness to a study of the geography and astronomy of the ancients. The fruits of this labour were his *Handbuch der alten Geschichte, Geographie und Chronologie* (Alt. 1803; 6th ed. 1837), and his *Untersuchungen über einzelne Gegenstände der alten Geschichte, Geographie, und Chronologie* (Alt. 1800-2). In 1804, 'B. was appointed Professor of History at Helmstedt, where he published for some years the *Chronik des 19 Jahrh.*, but afterwards returned to his favourite studies, and planned a great work on the history of all systems or conceptions of geography, from Homer down to the middle ages, only a small part of which he executed. In 1809 he was called to the University of Frankfurt-on-the-Oder, and in 1811 to Breslau, where he died, 5th September 1814. B.'s schoolbooks are very widely used in Germany; as his *Merkwürdige Begebenheiten aus der Allgemeinen Weltgeschichte* (Alt. 1810; 26th ed.), and his *Umständliche Erzählung der merkwürdigsten Begebenheiten aus der Allgemeinen Weltgeschichte* (Alt. 1810; 13d ed. 1852). See Kunisch, *B.'s Leben und Schriften* (Berl. 1816).

Brée, Matthæus Ignazius van, a Flemish painter, born at Antwerp in 1773, studied there and afterwards at Paris, and became one of the restorers of historical painting in Holland after the manner of David. He earned his reputation by his 'Death of Cato' (1798). Among his most famous works is that of the Leyden burgomaster in the act of addressing his famishing townsmen during the siege of 1576, and offering his body to be parted among them. It now hangs in the Leyden Town-house. Other works are 'Rubens Dictating his Dying Testament,' and the 'Tomb of Nero.' He was remarkably rapid in sketching and securing effect. B. died, Director of the Academy, Antwerp, 15th December 1839.

Breech, the part of a cannon or the end of the barrel of a firearm farthest away from the muzzle. Technically, when applied to muzzle-loading small-arms, the plug closing the rear end of the barrel. When applied to breech-loaders, it may mean either the rear end of the barrel or the mechanism closing it.

Breeches Bible, the name given to the celebrated *Geneva Bible*, on account of its translation of Genesis iii. 7, where the 'aprons' of the authorised version is rendered 'breeches.' This edition, published in 1567, was the work of English divines, persecuted from the country; and in it the text was first divided into verses.

Bree'ching, a naval term, meaning a strong rope by which the recoil of a gun or carronade is checked when the muzzle is so far within the porthole that the gunner can sponge and reload it.

Breech-Loading Arms are firearms loaded at the breech, as contradistinguished from those which are loaded from the muzzle. Though it is only within the last twelve years that the B.-L. system has been brought prominently into notice, it is not a modern invention, B.-L. A. having been in use more than three centuries ago. The earliest of which the date can be identified were made in 1537, and are of British manufacture. A perfect specimen, bearing the above date, is preserved in the Tower of London.

The early B.-L. A. were chamber-loaders—i.e., they had a detached loading-chamber at the breech, into which the charge

was inserted, instead of being contained in a cartridge, as is the case with modern breech-loaders. Owing, however, to the difficulty of closing the breech so securely as to prevent an escape of gas, which was nearly as dangerous to the party using the weapon as to those it was used against, the early B.-L. system may be said to have been a failure, and it is only during the present generation that the system has been employed with practical effect.

B.-L. A. were and are employed both for military and sporting purposes, and are of two classes—breech-loaders in the ordinary sense of the term, and repeaters; but it is intended to confine this paper exclusively to military breech-loaders; sporting and repeating arms being noticed under other headings.

The war between Prussia and Denmark in 1864, and between the former country and Austria in 1866, in both of which the Prussians used the B.-L. needle-gun with great effect, seems to have been the means of arousing the attention of all nations to the importance of B.-L. A.; although previous to 1864 such arms had been experimented with by various European Governments, and amongst others by that of our own country (two regiments of British cavalry having been armed with the Sharp B.-L. rifle in 1857, and the Terry and Westley-Richard rifle having been issued to a limited extent between 1857 and 1861).

In 1864 the British Government invited gunmakers and others to submit plans for converting the muzzle-loading Enfield to a breech-loader. About fifty different systems were submitted, and in the beginning of 1865 the Snider action was finally adopted. It was, however, only considered as a makeshift for the conversion of the large stock of muzzle-loading rifles then in hand, the question of the ultimate selection of a pattern on which to manufacture new weapons being left open.

In 1868 a committee was appointed by the Government to consider the question of B.-L. small-arms, with the view of selecting a rifle to replace the Snider. No less than 104 arms of different patterns were submitted to and examined by the committee, and after a preliminary trial, ten were selected for further experiment—four of which were on the bolt, and six on the block system. After farther trials with defective cartridges, the whole of the bolt systems were rejected as dangerous, and farther competition restricted to the block system, the prize being ultimately awarded to the Henry rifle. Instead, however, of recommending this weapon as a whole, the committee decided to deal with the barrel and breech action separately. After exposure, endurance, and rust tests, the arms left in the competition were reduced to two—viz., the Henry (sliding block), and the Martini (falling block). These were reported equal in safety and strength, but the Henry barrel far surpassed the Martini in accuracy; the Martini being a self-cocking action, it required one motion less to load and fire than the Henry; and on these grounds the committee recommended the adoption of the Henry barrel and Martini breech, and these being adapted to each other, and the arm christened the 'Martini-Henry,' it was finally selected as the weapon for the British army.

Meantime other nations have not been idle, and most of the European powers have their troops now armed with breech-loaders, though scarcely two countries have adopted the same system.

It would be impossible here to give anything like a detailed description of the various B.-L. A. actually in use at the present moment, while a mere catalogue of those proposed and abandoned within the last few years would form a long list. All that can be done, therefore, is to give a short description of the representative guns of the various systems.

Modern breech-loaders may be said to be divided into two main divisions—viz., the bolt and the block systems. In the former, the plug which closes the breech is advanced between guides, and fastened by a partial turn on its axis like an ordinary street-door bolt; while in the latter, the breech is closed by a block sliding in a vertical slot, or moving on an axis at the rear end or side of the barrel. The former is the plan generally adopted on the Continent, while the block system, in various forms, has found most favour in England and America.

The foremost weapon on the bolt system is the Prussian needle-gun, which was patented in England by Abraham Adolph Moser in 1831, and after some improvements by Dryse, a gunmaker of Sommerda, whose name it ultimately came to bear, it was adopted by the Prussian Government, and put into the

hands of their troops in 1848. This action is shown in Figs. 1. and 2.

The breech is opened by drawing back the bolt B in line with the barrel, and closed by pushing the bolt, the front end of which forms a conical cup, forward against the barrel, in which position it is secured by turning the knob or lever O a quarter of a circle to the right. The explosion of the cartridge, C, is effected by a steel needle, N (Fig. 1), which is driven forward by a spiral

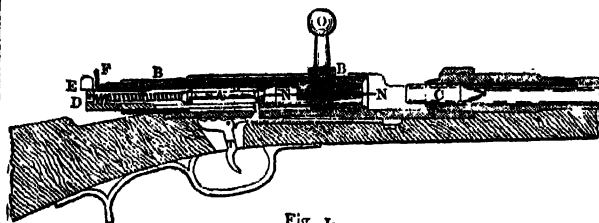


Fig. 1.

spring. The needle pierces the case of the paper cartridge, passes through the powder, and strikes the fulminate inside, a cap situated within the cartridge and immediately behind the bullet, as shown in Fig. 2. The base of the bullet is fitted into a sabot made of compressed paper, which is forced into the grooves of the rifle by the discharge, and causes the bullet to rotate with it. The cartridge being a self-consuming one, no extractor is required.

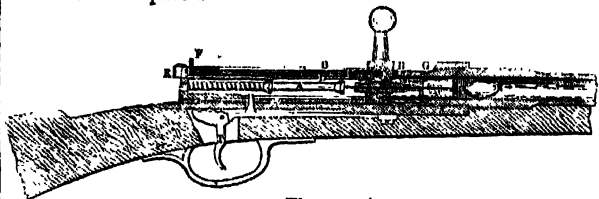


Fig. 2.

The breech action consists of three concentric hollow cylinders, with the spiral spring and needle-carrier A within the last; the whole working in a shoe into which the barrel is screwed, and which is attached to the stock. This shoe is open at the rear end, and immediately behind the barrel a space is cut in it sufficient for the insertion of the cartridge, while from this space to the rear a groove is cut sufficient to allow the knob or lever to pass along it.

In loading the gun, the first action is to withdraw the needle from the barrel by means of the thumb-piece E in rear of the lock, as shown in Fig. 1, pressing at the same time the spring-catch F, which requires releasing to allow of its withdrawal. The bolt-handle O is next struck upwards, so as to release it from the side-catch into which it fits when the breech is closed, and the bolt B drawn backwards, carrying the needle N and spring with it, thus opening the breech. The cartridge is then inserted into the chamber as shown at Fig. 1, and the breech closed by pushing the bolt forward and turning the handle to the right. The cocking is then effected by pushing in the end thumb-piece E to its original position, in which it is retained by the spring-catch F; this compresses the spring, the shoulder on the needle-holder A being held fast by the trigger-catch I, which allows it to pass backward when the sliding bolt B is withdrawn, as in Fig. 1, but catches and detains the needle-holder when the bolt is pushed forward again for closing the breech. The gun is fired by pulling the trigger T, which releases the needle-holder A, and allows it to be driven forward by the compressed spring, as in Fig. 2.

It has latterly been the fashion to speak rather disparagingly of the needle-gun, and although it may now be said to be obsolete, it at least, through the events of 1864 and 1866, was the means of converting the world to a belief in B.-L. A. for military purposes. But, under the name of 'Prussian needle-gun,' we are really considering a whole series of arms. Dryse, who took up the invention, never ceased to improve and alter it; and before his death had succeeded in adapting it for a metal cartridge, which experience has shown to be a necessity for any breech-loader. It is the parent of the Chassepôt, Beaumont,

Mausier, Vetterlin, and a host of modern plans; in fact, all modern breech-loaders on the bolt system resemble it more or less in some respects.

Coming to the block system, the Sharp (American) may be taken as the earliest. The breech action consisted of a vertical block moving in a slot in rear of the barrel, and depressed or raised by a lever forming the trigger-guard, the upper edge of the block being sharpened so as on being raised to cut off the end of a paper or linen cartridge previously inserted into the barrel, and the ignition being effected by means of a strong percussion-cap on a nipple outside the barrel, as in the muzzle-loading arms. This system of ignition is, however, now obsolete, the great escape of gas at the breech in all actions in which such a system of ignition was used proving detrimental to steady shooting. This defect was only obviated by the adoption of a metallic cartridge-case containing its own ignition.

Of modern systems of block actions, the Snider, Martini, and Henry each merit a brief description.

As previously explained, the Snider action was adopted by the British Government after a competitive trial as the best mode of altering the then existing stock of muzzle-loading rifles to breech-loaders. Since its first adoption various alterations and improvements have been made upon the action, but its characteristic features still remain. Figs. 3 and 4 show the action with all its latest improvements (No. 3 pattern).

In converting a muzzle-loading Enfield on the Snider system, the barrel is shortened by about 2½ inches, and the rear end

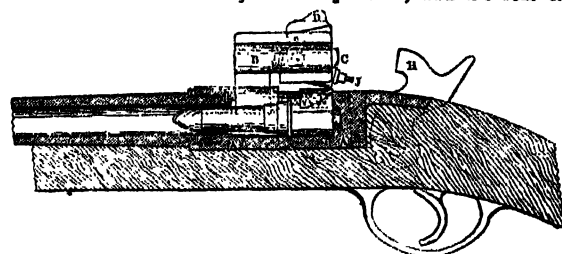


Fig. 3.

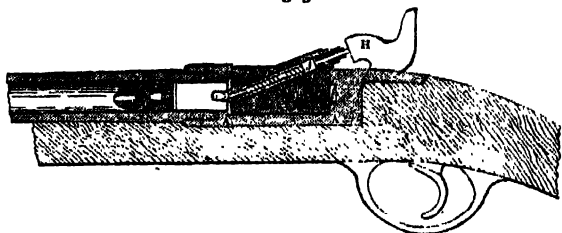


Fig. 4.

screwed into the shoe A, to the right side of which the solid breech-block B, which closes the breech, is hinged upon a longitudinal pin. When closed, this block fits into the shoe, its front end fitting close up to the breech-end of the barrel, and its rear end bearing against the solid face of the shoe, the block being securely locked by the spring-catch C. In opening the breech, the lever D is pressed by the thumb, by means of which the spring-catch C is withdrawn, and the block is then lifted and turned over laterally, as shown at Fig. 3. The cartridge is then inserted into the chamber, and the breech-block turned over into the shoe. The firing of the cartridge is effected by the ordinary side-lock, the hammer H of which, on pulling the trigger, acts upon the piston J, which passes through the breech-block obliquely, causing its point to impinge upon a percussion-cap in the centre of the base of the cartridge-case; the piston, on the hammer being raised, is drawn back into the breech-block by a light spiral spring. After firing, the empty cartridge-case is extracted by the extractor E, which slides upon the hinge-pin of the breech-block. The block itself is made to slide longitudinally upon the hinge-pin for a short distance, and on being fully opened is drawn back by the hand, carrying the extractor with it; and the latter having hold of the cartridge-case under the base flange, draws it out of the barrel. The block on being let go is returned to its original position by the spiral spring.

The Martini-Henry B.-L. rifle, which has been selected for adoption in the British army, is compounded of two independent inventions, viz., the action, invented by Mr Martini, a Swiss engineer; and the Henry barrel, the invention of Mr Alexander Henry, gunmaker, Edinburgh. As the latter will fall to be treated of under the head of RIFLES, it is only the breech action which requires to be described in this article.

In this action (Figs. 5 and 6) the breech is closed by a longitu-

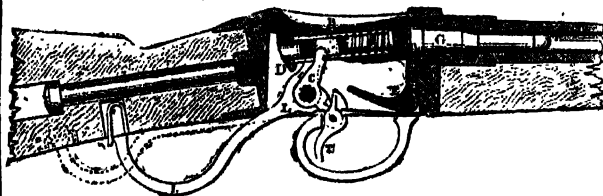


Fig. 5.

dinal falling block, B, working in a morticed steel body, which forms as it were a box or case to contain the mechanism. The block is hinged on a transverse pin passing through the sides of the body at its rear end, the end of the block being rounded off and fitting into a corresponding hollow in the body, so as to form a perfect knuckle-joint, A. The arrangement for ignition consists of a direct acting striker or piston, J, impelled by a spiral

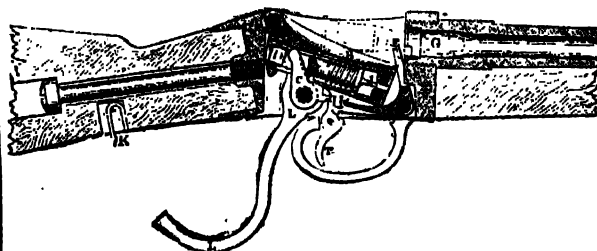


Fig. 6.

spring, both being contained within the falling block. In manipulating the rifle, the lever L is thrown smartly forward, and its inner arm, coming in contact with the hook D on the breech-block, draws it downward. At the same time the tumbler C, the point of which fits into a slot in the striker, is carried back with the lever, carrying with it the striker J, and compressing the spiral spring. The block, in falling, strikes the legs of the cranked extractor E, the upper prongs of which, fitting round the base of the cartridge-case, are thrown backward, thus ejecting the cartridge-case, as shown in Fig. 6. The front end of the block falls sufficiently to clear the breech end of the barrel, and its upper side is hollowed out and forms a groove to allow of the free entrance of the cartridge G into the barrel. On a cartridge being inserted, the lever is drawn backwards, and its inner end raises the breech-block, and closes it securely over the end of the barrel, the tumbler C, which holds back the striker and spring, being meantime retained at full cock by the tumbler-rest and trigger, H and T. There is a small spring-catch, K, in the stock, into which fastens the outer end of the lever and prevents it falling and opening the breech. On the trigger being pulled the tumbler C is released, and the striker J impelled against the cap in the base of the cartridge by the spiral spring which had up to this time been held compressed by the tumbler. A small indicator outside the body, and working on the same axle, serves to show when the rifle is cocked.

From the above description, it will be seen that the mere motion of the lever forward opens the breech, cocks the rifle, and extracts the cartridge. The stock of the Martini-Henry is in two parts, the butt being attached by a bolt through its centre screwed into the rear of the morticed steel body. The barrel is screwed into the front of the same body, and the fore end of the stock attached to it by bands.

The breech action shown in Fig. 7 is a recently improved construction of the vertical-sliding block action, the invention of Mr Alexander Henry of Edinburgh. The breech-block A is a stout block of steel, moving vertically in a slotted body at the rear end of the barrel. This block is attached to the

lever B, which forms the trigger-guard by the links C on each side, leaving space for the hammer between them, while the front end of the lever is hinged to the trigger-plate. The mainspring D is in front of the action below the barrel, while the hammer

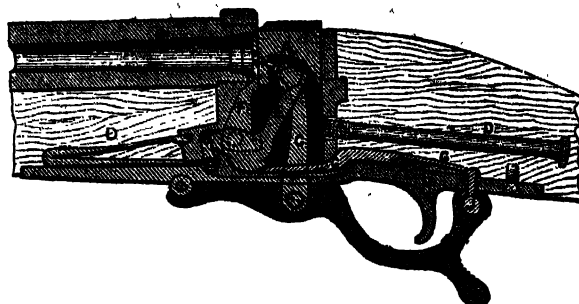


Fig. 7.

and extractor, E F, are both jointed on one hollow axle passing through a projection on the trigger-plate. On opening the lever, the breech-block is drawn downwards by the links, and the bottom of the latter when descending acts on curved feathers or projections on the hammer, drawing it back to full cock, where it is retained by the point of the sear G. On coming to full cock, the outer end of the hammer acts on the back of the extractor, throwing forward its upper end and ejecting the empty cartridge. On a cartridge being inserted, the lever is raised, carrying the block upwards and closing the breech; and on the trigger H being pulled the hammer is released, its point striking the cap in the cartridge through a small hole in the face of the breech. A small catch, J, in the end of the lever, keeps the latter in position when closed, and can at the same time be used as a bolt for bolting both trigger and lever when the rifle is at full cock.

The following table shows the rifles in use at present by the principal powers, with their relative weights, &c. :-

		Weight.
		Lbs. oz.
England, . .	{ Martini-Henry, . . .	8 12
	{ Snider,	9 1
America, . .	Springfield,	9 1½
Russia, . .	Berdan,	9 2
Austria, . .	Werndl,	9 11
Switzerland, .	Vetterli,	10 0
Prussia, . .	Mausers,	10 8
France, . .	Converted Chassepot, .	9 0
Belgium, . .	Albini-Braendlin, . .	10 3
Denmark, . .	Remington,	9 8
Turkey, . .	{ Snider and Martini- Henry, }	English pattern.

Breed, a perpetuated variety or race of animals, generally formed and induced by man, through a process of artificial selection. A *variety* of animals springs from deviations in a *Species* (q. v.). When such deviations become permanently embodied and perpetuated, the variety is termed a race or B. We are accustomed to speak of the various *races* of men, and of the *breeds* or perpetuated varieties of domestic animals, such as the horses, sheep, oxen, &c., and of birds, such as the pigeons. In plants, also, and perhaps in greater profusion than in animals, instances of specific variation, productive of varieties and breeds, are found. The varieties of roses, and of many other flowers and vegetables produced by artificial selection and cultivation, are too well known to require further enumeration. The *mode* in which breeds of animals and plants originate forms a very interesting topic, but, at the same time, a subject very difficult of elucidation and satisfactory or clear explanation. Mr Darwin has laid great stress on the primary *variation of species* in his theory of descent by *natural selection*. He thus supposes that in nature there is an endless tendency to greater or less variation in every species of animal and plant; and that this variation proceeds by nature *selecting*, as it were, those individuals which vary most from the original stock to carry on and perpetuate the variety, and so to form a race or B. These races or breeds, Mr Darwin holds, will in time also vary, as did the

original species; and the degree of variation from the original species will at last come to be so great, that a new *species* will be thus evolved by variation from the former one. In this view—which is supported by the consideration of our domestic animals—breeds or races mark a kind of intermediate stage of variation, which process is tending to evolve new species. But admittedly it is very difficult, and in some cases impossible, to pronounce where the mere B. or variety ends, and where new specific characters may be said to have been formed.

There is no doubt, however, that many of the derived breeds or races of pigeons, for example, differ as widely among themselves as other and admittedly distinct *species* of birds differ. And so with cattle, horses, and sheep, where the process of *artificial breeding* or *selection* has operated to produce varieties so different from the original species, that they might structurally be deemed distinct species.

Man, by *artificially* selecting animals possessing certain desirable characters, and by mating such, produces a new B. or variety, which combines the characteristics of the parents. The science of *breeding* is to a very great extent based on empirical laws—the results of experience; and it is one of the chief difficulties, alike of the breeder and theorist, to determine where the limits of fertility and sterility end or begin. (See HYBRID.) The chief points to which the breeders of sheep have paid attention are the character of the fleece and the shape of the body; those animals, a combination of the qualities of which seemed to be desirable, being thus mated to produce a new B. In oxen the quality of the flesh and milk, and in horses the form and stamina or enduring power, have respectively formed chief ideas in the guidance of the breeder. In a wild state breeds are produced, as between certain game-birds, and between wild cattle, deer, &c.; and in wild and domesticated animals, it is frequently impossible to determine the original stock or progenitors of the numerous derived races. See also HYBRID SPECIES, HORSE, OX, &c.

Bree'de, a river flowing in a S.E. direction through the district of Zwillingdam, Cape Colony, and entering St Sebastian's Bay, or Port Beaufort, from which it is navigable for a distance of 40 miles inland.

Bregenz (Lat. *Brigantium*), the capital of the circle of Vorarlberg, in the Tyrol, Austria, near the German and Swiss frontier, at the entrance of the small river B. into the S.E. part of Lake Constance, called *Bregenzer See*. It is an old town, with good railway communication, and has a large transit trade, and considerable manufacture of wooden wares. Its wine is celebrated. Near it is the *Bregenzer Klause*, a ravine between the Tyrol of Swabia, at one time having fortifications, which were swept away by the Swedes during the Thirty Years' War (1646), when B. itself was taken. The *Bregenzer Wald* is a well-wooded spur of the Algaun Alps, with a peak (Kanisfluh) 7200 feet high. Pop. of B. (1869) 3451.

Brehon Laws, the ancient laws of Ireland, or Judges' Laws (*Dlíghidh Breitheamhinn*), which Lord Eglinton's Commission of 1852 have been publishing—the first three volumes (1865, 1869, and 1873) being translated by Dr O'Donovan and Mr O'Curry, both of whom are now dead. The third volume contains a valuable preface. What has been published consists of the *Senchus Mor* (Great Book), which claims the authority of St Patrick and Dubhthach, the royal poet of Erin, and is assigned to the end of the 11th c.; and the *Book of Aicill*, or sayings of Cormac and Cennfaeladh, partly written by a retired king, and assigned to the end of the 10th c. There are minor tracts, such as the *Corus Bescna* and the *Crith Gablach*: each text has a commentary and marginal glosses. The Brehons were probably at first, like the Druids, if not a sacred, at least a literary class, having authority to declare the law in matters voluntarily submitted to them. From the influence of literary fosterage, the Brehon acquiring certain rights over the person and property of his pupil, this class would tend to become an hereditary caste. The laws distinguish the law of nature (pre-existing Celtic custom, either adopted or not abolished by St Patrick) and the law of the letter (the Bible as interpreted by the Church). There are traces also of the law having been declared by the chiefs at the triennial fairs. No consistent scheme of the B. L. is as yet possible, but on a variety of points the published volumes are explicit. Temporary cohabitation seems to have been

usual between the sexes, and legitimization of bastards (even adulterine) took place on payment of compensation to the putative parent. There were seven grades of chiefs, distinguished by their wealth in cattle, the importance given to their evidence, the amount of dues received from vassals, the amount of compensation due on injury, and their power of contracting. The *Bo-aire*, or man wealthy in cows, became an *aire-desa*, or inferior chief (*Kaith*). By appropriation of tribal waste-lands, by subordination of *Findhir* (broken men or stranger tenants), and by lending out their surplus stock of cattle to assist in agriculture, these chiefs gradually developed the laws of Jaerstock and Daerstock. In the former the *Ceile* or *Kyle* (tenants) held land for seven years, returning the growth, increase, and milk of the few cattle they received, and rendering also homage and labour in harvest and building. The latter was an oppressive tenancy (the origin of the 'cushering' and 'coign of livery' alluded to by Spenser in 1596), in which the tenant lost status, and gave a rent in kind, the chief having also a right of feasting at his tenant's expense. The *Findhirs* are also called *Senclaithe* and *Bothachs*, and were possibly men excommunicated from their native tribe, and not protected by native institutions. Both tribe and family are called *Fine*, and intermediate is the sept or joint-family. The family, or descendants of a living ancestor, divide into the *Gulfine*, *Deirbhfine*, *Jarfine*, and *Indfine*, containing seventeen members. On the birth or adoption of a new member, the senior member for each 'Fine' but the last is promoted to the 'Fine' above, and the seventeenth member leaves the family. The grouping here is radically different from that based on 'degrees,' and now universal. Before the 17th c., when the Anglo-Irish judges established primogeniture, the rules of succession were those of Tanistry as regards the succession of chiefs, and Gavelkind, or rather divisions among the males of the sept, whether bastards or not, according to antiquity, in the case of family property. Latterly the power of disposing of property during the life of the head of the family seems to have been partially recognised, the ancestor becoming a 'pensioner.' Similarly the land, which was at first either tribal or unappropriated, gradually became in the first case subject to division at the end of ten years, or held in severalty under purchase or other contract. The restraints on alienation were relaxed in cases of acquired property, or of necessity, or of poets and judges, or of promises to the Church. 'Rundale' occupation and the duty of uniform tillage survived the tribal occupation. The original monastery and the minor abbots and bishops which sprang up in its neighbourhood also retained a sort of tribal relation, a blood-relative of the founder being preferred to the abbots. The subject dealt with in most detail in the volume of 1865 is the law of distress. The custom of a creditor 'fasting' at the door of his debtor by way of giving notice to pay, resembles the Hindu custom of 'sitting Dharna,' and the Persian custom of sowing barley and sitting at the door. This distress, which proceeded before an agent and witnesses, was entirely free from judicial authority, and extended to all breaches of contract. When the 'dithum,' or stay in the public pound, was exhausted, the pledge was gradually absolutely forfeited according to the amount of the debt. (See Sullivan's *Introduction* to O'Curry's *Manners and Customs of Ancient Ireland*; Maine's *Lectures on Early Institutions*.) The general result seems to be to reveal a greater similarity between Celtic and archaic Teutonic, and indeed all Aryan civilisation, than has hitherto been admitted.

Breisach Alt (the *Mons Brisiacus* of Cæsar), a very old town in Baden, on the right bank of the Rhine, on a steep basaltic hill, 800 feet above the sea, 12 miles W. of Freiburg. It was once a free imperial town, and until the middle of last century was reckoned one of the strongest fortresses, the very key, in fact, of W. Germany. The minster of St Stephen is remarkable for a beautiful altar-screen of carved wood. Weaving, agriculture, and cattle-rearing are the chief industries pursued by the inhabitants, who number (1872) 3255. The French, into whose hands it came at the close of the Thirty Years' War, destroyed its fortifications in 1744, and they have not since been restored. By the peace of Presburg, B. was ceded to Baden in 1805. See Rosmann and Ens, *Geschichte der Stadt B.* (Freib. 1851).—**Neu B.** (Fr. *Neuf Brisach*), a town and fortress in Upper Alsace, on the Rhine, opposite Alt B., was built by Louis XIV. in 1699, and is one of the strongest military posts in the pro-

vince. It was besieged by the Germans during the Franco-Prussian war, and capitulated 10th November 1870. The place is an octagon in shape, has a pop. (1873) of 2627, and carries on a small trade.

Breitenfeld, a village of Saxony, a few miles N. of Leipsic, with 177 inhabitants. It is remarkable for three great battles fought in its neighbourhood—(1) that between the Swedes and Saxons, commanded by Gustavus Adolphus, and the Imperialists led by Tilly, September 7, 1631, when the former gained a decisive victory, which established Protestantism in the N., and secured the freedom of Germany; (2) that between the Swedes under Torstenson and the Imperialists, led by the Archduke Leopold and Piccolomini, October 23, 1642, in which the Swedes were again victorious. The Imperialists lost the greater part of their artillery and standards, and all their baggage. (3) One of the great group of battles between the Allies and Napoleon at Leipsic, 10th October 1813.

Bremen, a free city of Germany, next to Hamburg the greatest of German ports, and the chief emporium of the American trade, lies on the Weser, 50 miles from its entrance into the North Sea. It is divided into three parts—Old B., New B., and a suburb surrounded by the river, which separates into the large and Little Weser before reaching the town, and which on leaving it reunites. Communication is kept up by means of three bridges, one of which was completed in 1875. The chief public buildings are the cathedral, founded in 1050; the Church of Ansarius (1229), supporting a tower 370 feet high; the Gothic town-hall (1410), with its arcade, statues, and celebrated wine-cellars; the old guild-house (*Schütting*); the exchange, the museum, and the observatory (1856), long under the care of the famous Dr Olbers. B. has thirty high schools, with 3841 pupils and 249 teachers; and twenty-four free schools with 7782 pupils and 199 teachers, besides many technical schools and a public library of 20,000 vols. The city was formerly surrounded by fortifications, and these have now given place to beautiful promenades. Many improvements have been recently made, including the erection of the new city waterworks (1872), also of an imperial post-office (1873), and of an extensive railway terminus (1875), the last being required by the opening of three additional lines connecting B. more directly with Berlin, Hamburg, and the S. of Germany. Owing to its isolated position as a free city, B. is deprived of the privileges of the German customs union, and its industries have therefore somewhat declined, although its trade is rapidly increasing. There are manufactures of soap, sailcloth, and asphalt, besides which there are 201 tobacco and cigar manufactories, producing cigars to the value of some £1,120,000 yearly; three sugar-refineries, several distilleries and rice-shelling mills, fourteen engineering works and iron-foundries, and shipbuilding yards (chiefly at Bremerhaven—q. v.) employing about 1000 men. Trade is chiefly carried on with United States, Great Britain, S. America, W. Indies, and Burmah; and the imports are cotton, tobacco, wool, silk, coffee, rice, indigo, hops, coals, and petroleum; exports, woollen and cotton goods, iron and steel wares, cigars, books, ribbons, musical instruments, and toys. In 1874, 3407 vessels of 990,101 tons entered the port, and 3243 of 903,015 tons cleared; while the imports (1873) amounted to £26,270,500, and the exports to £20,381,900. The number of ships belonging to the port was (1875) 226, of 176,115 tons. B. was long the chief Continental port for emigration, the number of emigrants being (1872) 80,212, (1874) 30,636; it is now, however, surpassed by Hamburg in this respect. There is a large river trade at B. itself, but the harbour is only seven feet deep, and most of the shipping is carried on at Bremerhaven. Pop. (1873) 88,146. In the reign of Charlemagne, B. was made the see of a bishop, and in later times it became a leading Hanse town. The French captured it in 1810, but it regained its freedom in 1813, and two years later it was attached by the Congress of Vienna as a Hanse town to the German Confederation. It is now a portion of the German empire, always preserving its separate governmental existence.—The small republic of B. has an area of some 100 sq. miles, and a pop. (1873) of 130,871. The government, by Constitution of 21st February 1854, consists of a senate and municipal council. The first comprises eighteen members, of whom two are burgomasters; and the latter 150, elected for six years. In 1871 the revenue was £1,767,473, and expenditure £2,678,286; while the public debt

was £1,965,139. Besides the capital, B., the towns Bremerhaven and Vegesach belong to the republic. See Roller's *Geschichte der Stadt B.* (4 vols. Brem. 1799-1804); Buchenan, *Die Freie Hansestadt B. und ihr Gebiet* (Brem. 1862); and the *Bremischer Jahr-Buch* (5 vols. 1864-70).

Bremer, Fredrika, an eminent Swedish novelist, was born, 17th August 1801, at Tuorla, near Abo, Finland, whence she was taken, at the age of three years, to Stockholm. There her novels first appeared in 1835. She visited England, Germany, and America, and embodied her recollections of the last country in her *Homes of the New World*. She died 31st December 1865. Several of her works have been translated into English by Mrs Howitt—among others, *The Neighbours*, *The Midnight Sun*, *Life in Dalecarlia*. Her writings are distinguished by sound judgment, keen knowledge of character, a terse and lucid style, and delicacy and vividness of description. They have become widely and deservedly popular throughout Europe. The collected editions of her works in Swedish are the *Tekningar ur Hvardagslivet* (7 vols. Stockh. 1835-43), and its supplement, *Nya Tekningar*, shortly after. But the only complete edition is in German (*Gesammelte Schriften*, vols. 1-50; Leips. 1857-63). See *Frederika B.'s Lebensschilderung und nachgelassene Schriften* (2 vols. Leips. 1868), published by her sister, Charlotte Quidding.

Bremerhaven ('haven of Bremen'), a seaport at the mouth of the Weser, on its right bank, 32 miles N.N.W. of Bremen by rail, has shipbuilding yards and two harbours, of which one, constructed 1847-66, can admit the largest war-ships. B., which is protected by Fort Wilhelm, occupies a site bought by Bremen from Hanover (1827) for £23,798. In 1871 there entered the port 1255 vessels of 1,254,302 tons. Pop. (1873) 10,596. B. has an 'emigrants' house' for 3000 persons.

Brenner, a mountain in the Tyrolese Alps, between Innsbruck and Sterzing, 6853 feet high, crossed by the lowest of the great Alpine passes at an altitude of 4609 feet. The pass is available at all seasons, and on its summit are the village of B. and the B. Lake, where the Eisach, a feeder of the Adige, and the Sill, an affluent of the Inn, take their rise. It is crossed by a railway, completed in 1867, by which the trade between Venice and S. Germany and Austria is greatly facilitated.

Brennus (probably the Cymr. *Brenhin*, 'a king'), the title of the leader of the horde of Senonian Gauls who in 390 B.C. crossed the Apennines and inflicted a signal defeat on the Romans at the rivulet of the Allia. His troops gave themselves up to cruel and senseless mutilation of the slaughtered Romans, to drunkenness and sleep, and it was not till the third day that he entered Rome. Meanwhile the Capitol had been secured, and B. wreaked his vengeance on the aged patricians, whom he found resolved on not surviving the destruction of the city. The Capitol stood a siege of six months, when B. and his forces agreed to be bought off for 1000 lbs. of gold. With this booty, according to Polybius, they returned to Gaul. Livy, however, adopting what Mommsen calls 'a legend of late and wretched invention,' represents them as having been entirely cut off by Camillus, who suddenly appeared at the head of an army just as the gold was being weighed.—Another B. was the leader of the descendants of those Gauls who (according to Livy) had recrossed the Rhine, marched eastward, and settled in Pannonia on the Middle Danube. In 279 he made a double irruption into Greece during the absence of Pyrrhus, ravaging Macedonia and Thessaly, and finally marched upon Delphi to plunder its wealthy shrine. The Delphians, strongly posted, withstood him with 4000 men; the host of B. was routed, and himself wounded. He might have escaped; but Pausanias says that, resolving not to survive his shame, he quaffed strong wine so copiously as to bring about his death.

Brenta (the *Medoacus Major* of the Romans), a river of N. Italy, has its sources in Lake Caldonazzo, near Trent, in the Tyrol, and enters the Venetian territory at Primolano. Below Padua it becomes navigable, and falls into the sea at Brondolo. Long ago the Venetians, to preserve their lagoons from being silted up by the floods of the B., cut a channel (*B. Nuova*) which considerably relieved the bed of the river. The original bed of the

B. was then used as a canal, *Naviglio di Brenta morta or magra*, and still forms the water communication between Venice and Padua.

Brenta'no, Clemens, a dramatic poet and novelist, belonging to the Romantic school, was born at Frankfurt-on-the-Main, 9th September 1778. He studied at Jena, and after a restless, changeful, and morbid life, died at Aschaffenburg, 28th July 1842. B. had a fine satiric faculty. His *Lustige Musikanten* ('Merry Musicians,' Frankf. 1803) and *Ponce de Leon* (Gött. 1804) display great dramatic power and brilliant wit; while his *Geschichte vom Braven Kaspar und dem schönen Annerl* (2d ed. Berl. 1851) is an admirable specimen of the novel 'in little.' His last work, *Gohel, Hinkel, und Gakeleia* (Frankf. 1838), delineates the follies of his own time with mocking irony. He was so dissatisfied with a collection of poems which he had published at Hamburg in 1819, under the title *Schnéglöckchen*, that he bought back the copies for the purpose of destroying them. Some tales and poems of his were posthumously published. As the brother of Goethe's Bettina von Arnim, he has a double chance of being remembered.

Brentford, a market-town of Middlesex, at the junction of the Brent with the Thames, 7 miles W.S.W. of London. It is a station on a loop-line of the London and Southampton Railway, and is connected with the Great Western by a small branch line. B. consists chiefly of one long, narrow street, has soap factories, sawmills, large gas and water works, and extensive market-gardens. Pop. (1871) 11,091. B. is a very ancient place. Here, in 1016, Ironside defeated the Danes; and in 1642 the Royalists defeated the Parliamentary forces under Colonel Hollis.

Brent Goose. See BARNACLE GOOSE.

Brescia (anc. *Brixia*), the capital of a province of the same name, N. Italy, picturesquely situated on the rivers Mella and Garza, 60 miles E.N.E. of Milan, on the Milan and Verona Railway. It has manufactures of woollens, silks, leather, paper, and oil, is noted for its wine (*Vino Santo*), and is the site of a great silk fair. It contains an old and a new cathedral, the former belonging to the 9th c., the latter built 166, 1824, and containing many beautiful paintings. There are numerous Roman remains, the most complete of which is the so-called Temple of Hercules, excavated in 1827, and now forming a museum of antiquities. B. has a fine public library (*Biblioteca Quiriniana*), containing 35,000 volumes and many valuable manuscripts, founded (1750) by Cardinal Quirini. In 1429 the town was almost destroyed by the French under Gailard. It resisted the Austrian rule in Lombardy but was taken by Haynau in 1849. Pop. (1871) 38,906.

Breslau (Lat. *Wratistavia*, Pol. *Wrocław* or *Wraciszlaw*, or *Wratistavia*), the capital of the Prussian province of Silesia, the third residence of the court, and, next to Berlin, the largest city in the monarchy, is situated at the confluence of the Oder and Ohlau, 140 miles E. of Dresden, and 195 S.E. of Berlin. It is divided by the Oder into the old and new town, connected by many fine bridges, and has, in addition, five large suburbs. It contains many beautiful buildings, and of the numerous handsome squares, the chief is the Great Ring, containing the old town-house, built in the 14th c., the new one erected in 1863, the equestrian statue of Friedrich the Great (1842) by Kiss, and that of Friedrich Wilhelm III., unveiled in 1861. The two principal churches are the Cathedral of St Mary's (1288), and the Protestant Church of St Elizabeth, with a tower 364 feet high. B. has a university, founded in 1702, with about 1000 students, and a free library of 300,000 volumes; also a medical school, five gymnasia, and several Protestant colleges. It has five railway stations, and is the centre of the Silesian trade, having great wool and cattle markets. There are also important manufactures, chiefly in woollens, cottons, linens, lace, silks, spirits, machinery, jewelry, and earthenware. B. is not mentioned earlier than 1018, and is of Slavic origin. It was the capital of an independent duchy (1163-1335), afterwards a member of the Hanse League, and a free imperial city; and finally, in 1741, was wrested from Austria, along with the rest of Silesia, by Friedrich the Great. Here the peace between Prussia and Austria was signed, June 11, 1742. The Austrians recovered B., November 22, 1757, but it was retaken by Friedrich a month afterwards. It capitulated

to the French in 1807. In 1813 it was dismantled, and its fortifications were converted into beautiful promenades. Pop. (1871) 207,997, of whom upwards of 45,000 are Roman Catholics and 11,000 Jews. See S. B. Klose's *Documentirte Geschichte und Beschreibung der Stadt B.* (5 vols. Bresl. 1780-83), and Luch's *Führer durch B.* (3d ed. Bresl. 1863).

Bressay, one of the Shetland Islands, about 5 miles long and 3 broad, separated from Lerwick by B. Sound, one of the best natural harbours in the world, being almost enclosed by land. At its northern entrance is a dangerous sunken rock, called the Unicorn. The pop. of B. in 1871 was 878, chiefly engaged in fishing or in exporting slates. To the E. of B. is a precipitous and rocky isle, called the Noss, 6 miles in circumference, and rising to nearly 600 feet, with a pop. of 24. The Noss is connected with B. by a rope-bridge.

Brest, a seaport of France, department of Finistère, possessing one of the best harbours in Europe, lies on the N. side of the landlocked Road or Bay of B., which communicates with the sea by the strongly-defended channel of *Le Goulet*. It is a fortress of the first rank, and the greatest naval station of France. The town is on a very uneven site, and is divided into two parts by the Penfeld, at the mouth of which is situated a castle, anciently the residence of the Dukes of Bretagne. The principal buildings are the Church of St Louis, begun in the 17th c., a splendid marine hospital, a fine new theatre, and a town library with 25,000 volumes. A new floating dock, quays, and pier were completed in 1876 at a cost of 22,500,000 francs. B. has extensive shipbuilding yards, storehouses, and barracks, handsome quays, and excellent schools of instruction in navigation and marine engineering. Since 1867 B. has had telegraphic communication with America by means of a submarine cable. The total number of vessels that entered the port in 1874 was 1499 of 88,886 tons, and that cleared, 1518 of 87,371 tons; while the total value of imports was £644,474; of exports, £395,963. At the 31st of December 1873 B. had belonging to her own port 187 vessels (4799 tons), of which the great part are engaged in coasting and fishing. Pop. (1872) 50,833. B. is a town of considerable antiquity, but it only rose to importance in the 17th c. It was strongly fortified by Vauban in 1680. The English fleet under Admiral Howe gained a complete victory here over the French, June 1, 1794.

Bretagne or **Brittany**, at different times a kingdom, dukedom, and province of France, included a territory (now represented by the departments of Finistère, Côtes-du-Nord, Morbihan, Loire-Inférieure, and Ile-et-Vilaine) forming the N.W. angle of the country, and bounded on the N.W., W., and N. by the Atlantic and English Channel. At the time of Caesar's invasion B. formed a part of the maritime district of Armorica, and the names of the principal Celtic tribes who inhabited this district—the Veneti, Redones, and Nannetes—are preserved in the names of the Breton towns Vannes, Redon, and Nantes. Under the Romans, whose authority, however, was only partial, it was called *Provincia Lugdunensis*. After the 4th c. it appears as the head of an Armorican confederation of republican states. Soon after kings appear. In 497 the country was conquered by the Frankish King Chlodwig. The Franks now began to call the inhabitants *Brettons*, as indeed the Latin writers of the 5th c. had already done. These speak of *Britanni* and *Brittones*, and designate the land *Britannia Cismarina* (later, *Britannia Minor*), in contradistinction to the island of Britain across the Channel, and also in allusion to the common Celtic ancestry of both peoples. The Frankish lordship was reasserted by Charlemagne and his successors. Meanwhile, though B. was sometimes ruled by native princes who called themselves kings (c.p., 824-874), the title at last became extinct, and the country was divided into a number of counties, as Rennes, Vannes, Cornouaille (Cornwall), &c. The suzerainty of B. passed to the Normans in 912. B. became a separate dukedom under Geoffroi, Count of Rennes, in 992. In the middle of the 12th c., the succession to the throne was disputed, but by the marriage of Constance, daughter of one of the claimants, to Geoffrey, son of Henry II. of England, B. passed for a time into the possession of the house of Plantagenet; but on the death of Prince Arthur, in 1203, Normandy was confiscated by the French king, and B. passed with it under the

French crown. It passed in 1213 to Pierre Mauclerc, Comte de Dreux, who had married a daughter of Constance. Claude, daughter of the last Duchess of B., married the Duke d'Angoulême, who ascended the French throne as François I. in 1515. By the articles of marriage Claude ceded her rights to B. to her husband, and the ancient dukedom was formally incorporated with France as a province in 1532. See Daru's *Histoire de B.* (3 vols. Par. 1826); Roujoux's *Histoire des Rois et des Ducs de B.* (2 vols. Par. 1829); De Courson's *La B. du 5^{me} au 1^{ame} Siècle* (Par. 1863).

The Breton (*Breizounek*) language belongs to the Celtic family, and, along with Cornish and Welsh, forms the Cymric (*Cymraeg*) branch. It gradually received Romance elements; and after the incorporation of B. with France, it was greatly changed, and in Upper B. completely suppressed. In Lower B., on the other hand, it has maintained its existence till the present day, in different dialects, of which those of Vannes, Cornouaille, Tréguier, Léon, and St Brieuc are the most important. About 1,200,000 people in the province use one or other of these, and are known, in contradistinction to the French-speaking population, as *Bretons Bretonnants*. They inhabit the departments of Morbihan, Finistère, and Côtes-du-Nord.

The Breton literature in its earliest stage (from the 5th to the 12th c.) may be said to be identical with that of the *Cymraeg* of Wales. The works of the 'bards' belong to both sides of the Channel, and several of them are believed, at least by German and French critics, to have originated in B. rather than in Wales. But after the 12th c., when Normans, Anglo-Normans, and French, more and more extended their authority over the district, and allied themselves with the leading families, the bards gradually found countenance only among the gentry of Lower B., or even as wandering minstrels sought the favour of the common people. Yet the wide sweep of the Arthurian Romance (q. v.) shows that the Breton literature had powerfully influenced the W. of Europe; and although the French tongue made rapid strides among the higher classes, the peasantry clung with singular tenacity to the old tongue of the country, preserving in their hearts and on their lips its ancient songs and legends, and even adding fresh matter to its poetic lore. An admirable collection of these songs was published by Hersart de la Villemarqué (*Barzaz-Breiz*, 2 vols. Par. 1839; new ed. 1846), while the legends have been worked up by Souvestre in his *Foyer Breton* (Par. 1844). More than 150 mystery-plays were composed in the Breton language, and acted and printed in the 16th c. Several priests, too, wrote religious poems and books of instruction for the people. The most celebrated was Michel le Nobletz de Kerodern (1577-1651), whose sermons and songs were received with great enthusiasm. Among his successors, Father Julien Maunoir (1606-83) achieved scarcely less success. Later names in the department of religious poetry are those of Marzin, Delrio, and Lannion; while Gregoire of Rostrennan, Le Pelletier, but, above all, Le Gonidec (died 1838), have done good service to the study of the language by their lexicons and grammars. The last has given us the best Breton grammar (Par. 1807; 3d ed., by Villemarqué, 1850), and the best Breton dictionary (Angoul. 1821; 3d ed., by Villemarqué, Par. 1847). He also published a series of translations, including one of the entire Bible, into Breton (1827). Since his time, not only have the earliest literary monuments of the country been collected and published, but journals have been started, and a crowd of poets and *litterateurs* have come forward using the native tongue. Ricou, Brizeux, Goesbrand Laouénou, and the Abbé Elech particularly deserve mention. See the writings of Villemarqué and Souvestre.

Brethren and Sisters of the Free Spirit, a sect in the 13th c., whose original name was the Ortlibenses and Amalricians, assumed their later name from the words of St Paul in Rom. viii. 2, 14. On this ground they claimed freedom from the guilt of sin and outward ordinances; and consequently soon lapsed into fanatical lawlessness and licentiousness. They were dispersed in the 14th c. by persecution.

Brethren of the Common Life, or of Good Will, a Dutch branch of the sect called the 'Friends of God,' was founded by Gerard Groot, of Deventer (1340-84), a canon of Utrecht and Aix, who gave up his ecclesiastical position to devote himself to missionary preaching, by which he excited

great enthusiasm throughout Holland. When prohibited from preaching, he established a theological college in his own house, which was developed after his death into a monastery of regular canons. These were joined by many laymen, who lived together in a community of goods, but without any monastic vow. Within fifty years of Groot's death they numbered seventeen churches in the Netherlands, but the order was extinguished by the Reformation.

Bretignay, a village in the department of Eure-et-Loire, France, where, on May 8, 1360, a treaty was concluded between England and France, by which Edward III. renounced his claim to the French throne, gave up his possessions in the N. of France and the basin of the Loire, and had his title to Guienne and Gascony made independent of the French king; and Jean II. of France, then a prisoner in England, was released on agreeing to pay a ransom of 3,000,000 crowns. This he was enabled to do by receiving from Galeazzo, Visconti of Milan, 600,000 gold florins for the hand of his daughter Isabelle.

Breton de los Herreiros, Don Manoel, a popular Spanish poet, was born, 19th December 1800, at Quel, Lagroño. Educated at Madrid, he served in the army (1814-22), and afterwards held several Government appointments. The success of his *A la Veja Viruelas*, a comedy in three acts, represented 24th October 1824, determined his career. During the next eleven years he produced 120 dramatic pieces—a fecundity intelligible when it is known that many of these were adaptations of old Spanish plays, or translations from the French and Italian. A recent production, *La Desvergüenza* (Mad. 1858), is a poem of great length and full of humour. B. was elected a member of the Royal Academy of Spain in 1837. A collection of his works, in 5 vols., revised by himself, appeared at Madrid (1850-52). His rich comic vein and his causticity are not more remarkable than the easy harmony of his style. He died November 1873.

Bretschneider, Heinrich Gottfried, a German satirist, born at Gera, 6th March 1739, and educated at the Hernalshuter Institute at Elbersdorf, and afterwards at Gera. During the Seven Years' War he entered the Prussian army, was taken prisoner by the French at the battle of Kolin, and retained in a Prussian fortress till the peace of Hubertsburg in 1763. He afterwards travelled in England and France, was librarian to the University of Ofen in 1778, incurred there the enmity of the Jesuits, though befriended by Joseph II., and, after several changes of position and residence, died at Krzimiz, near Pilsen, in Bohemia, 1st November 1810. His *Almanach der Heiligen auf das Jahr 1788* is a trenchant attack on priests and monks. He had previously, in 1774, attacked Wertherism, then rampant in Germany, in his *Eine Entsetzliche Mordgeschichte von dem Jungen Werther*. He is said to have furnished Nicolai materials for his *Voyages*.

Bretschneider, Karl Gottlieb, a German theologian, born at Gersdorf, Saxony, 11th February 1776, and educated at Chemnitz and Leipsic. In 1807 he was appointed chief pastor at Schneeberg; in 1816 superintendent-general at Gotha, and in 1840 Upper Consistorial Councillor. He died 22d January 1848. B.'s writings still maintain their place in German theology from their learning and impartiality. The *Handbuch der Dogmatik der Evan. Luth. Kirche* (2 vols. Leips. 1814-18), *Lexicon Manuale Græco-Latinum in Libros N. Testamenti* (Leips. 1824 and 1840), and *Corpus Reformatorum* (vols. i.-xv. Leips. 1834-38), are among his more important contributions to theological literature.

Brett'en, a town of Baden, 13 miles E. from Karlsruhe, interesting as the birthplace of Melancthon. Pop. 3352.

Breughel, Pieter, the head of a famous family of Dutch painters, born at Breughel, near Breda, was a clever painter of rural life (hence his name, 'Peasant B.'). His works are distinguished for truth and for vivid colour. Of his birth and death the dates remain unfixed, but he flourished between the first and last quarters of the 16th c.—Pieter B., the younger, his son, known also by the surprising *sobriquet* of 'Hellish B.' on account of the fiends, witches, and robbers who figure in his works, died in 1625.—Jan B. ('Flower B.'), born at Brussels in 1568, was distinguished in landscape and in small figure subjects, and died at Antwerp, 1625. He painted the landscapes

for the works 'Adam and Eve in Paradise' and 'Vertumnus and Bellona,' in concert with Rubens, who supplied the figures.—Other members of the family were Abraham, Jan Baptist, and Gaspar B., painters chiefly of fruit and flower pieces.

Breve, the longest note used in old musical notation, written commonly |C|. It is not now used, except in *Alla B.* (q. v.), or *Alla capella* movements.

Breve. See ANT-CATCHER.

Brevet is a commission in the army conferring rank above that for which the officer receives pay. In former times, B. promotions were made about once in six years, or upon very special occasions of national rejoicing, such as the ending of a war or a coronation. But general brevets are now abolished, some particular promotions by B. being, however, retained. A lieutenant-colonel by five years' service obtains the rank of colonel, but without increase of pay. Lieutenant-colonels, majors, and captains may obtain B. rank for distinguished services in the field, the promotion carrying relative increase of pay, except as regards the lieutenant-colonels. B. rank does not affect the position in a regiment, but is of importance in this respect, that colonels rise by seniority alone to be general officers, and, except in the artillery and in the engineers, colonel is a B. rank only. In the navy there is no B. rank.

Breviary (Lat. *breviarium*, from *breve*, short, and *orarium* (?), a collection of prayers) is a collection of the Psalms, Lessons, Prayers, and Hymns which form the daily offices of divine service, as distinct from the Liturgy. The books from which the B. was compiled were—(1) The *Psalter*, including the Psalms of David, the Te Deum, Athanasian Creed, &c. (2) The *Antiphonarium*, a collection of short sentences, chiefly taken from the Bible, sung before or after a psalm or canticle as a keynote to its application. (3) The *Hymnarium*, or hymnal. (4) The *Collectarium*, a book of collects or short prayers to be offered by the priest in behalf of the people. (5) The *Homiliarium*, a collection of homilies or religious addresses, founded on passages of Scripture, by the most eminent of the Fathers. (6) The *Pasionarium* and *Martyrologium*, which were books of the acts and sufferings of martyrs, to be read on their anniversary days in the churches where they were buried. The B. was perhaps introduced about the 6th c., when St Benedict condensed the daily offices for his rule; the name was in common use in the time of Micrologus, who wrote a treatise on the service of the Mass about 1080. There have been a great variety of breviaries, but they may all be reduced to four principal classes: the Roman, the Gallic, the Mozarabic or Old Spanish, and the Anglican.

Breviling'ua, the name applied to those *Lacertilia*, or Lizards (q. v.), in which the tongue is thick, fleshy, and protrusible, or capable of being protruded only when the mouth is open. This name is used in opposition to the term *Fissiling'ua*, which denotes those lizards in which the tongue is bifid or cleft or sheathed, and capable of protrusion through a notch in front of the jaws, even when the mouth is closed. The B. (or *Pachyglossa*) are represented by the geckos, iguanas, &c.

Brevipenna'tæ. See BRACHYPTERES.

Brewing. See BEER.

Brewing (in law). Instead of a licence to brew being now required, as formerly, duties are levied on the quantity brewed. The brewer must make specified entries at the nearest excise office. The penalty for omission is £200, with forfeiture of implements and materials. Officers may enter any place used for B. at any time, in order to inspect. The penalty for obstructing an officer in so doing is £100.

Brewster, Sir David, LL.D., D.C.L., F.R.S., &c., one of the greatest physicists of this century, was born at Jedburgh, December 11, 1781, and entered Edinburgh University in 1793 with the design of becoming a clergyman. Though he completed his course, and even made an effort to obtain a charge, his tastes lay in the direction of science, to which he dedicated a long and valuable life. In 1807 he was an unsuccessful candidate for the chair of Mathematics in St Andrews; but in the same year was made LL.D. of Aberdeen, M.A. of Cambridge, and a member of the Royal Society of Edinburgh. Soon after, he commenced the publication of the *Edinburgh Encyclopædia*, a work completed in 1830. In 1811 B. invented his 'polyzonal

lens,' which, notwithstanding its superiority to the old parabolic reflectors, was not introduced into our lighthouses till 1835. He took an early and abiding interest in the British Association, of which he was President in 1850. Knighted in 1832, he received the Prussian Order of Merit in 1847, was elected a foreign Associate of the Institute of France in 1849, and appointed Principal of Edinburgh University in 1860, which post, together with that of President of the Royal Society of Edinburgh, he held at his death, February 10, 1868. B.'s most popular inventions are the kaleidoscope and the lenticular stereoscope. Of his numerous memoirs, we may mention those *On the Depolarisation of Light* (1813), *On the Polarisation of Light by Reflection* (1815), *On the Production of Polarising Structure in all Substances by Pressure* (1816), *On the Laws of Polarisation and Double Refraction in all Regularly Crystallised Bodies* (1818), *On Elliptical Polarisation* (1830). Besides these, he wrote treatises on the *Kaleidoscope* (1819) and on *Optics* (1831), Lives of Euler, Newton, Galileo, Tycho Brahe, and Kepler, *Letters on Natural Magic* (1831), and *More Worlds than One* (1854). His last memoir, which he left unfinished, was *On the Motion, Equilibrium, and Forms of Liquid Films*. See *Home Life of Sir David B.*, by his daughter, Mrs Gordon (Edinb. 1809).

Brewster, William, the leader of the *Mayflower* Pilgrims, was born at Scrooby, 1566, and educated at Cambridge. He left the Established Church, and founded a separate society in his house. In 1608 he went to Holland, and opened a school at Leyden. He was made ruling elder, and conducted the Pilgrims in the *Mayflower* to Plymouth, Mass., in 1620. B. was their only spiritual teacher for some years, but he did not administer the sacraments. He died April 16, 1644, and is venerated as the ruling spirit in the earliest New England colony.

Brexia'ceæ, a small order of Dicotyledonous plants, principally natives of Madagascar. There are in all about six species, belonging to the genera *Brexia*, *Ixerba*, *Rousseæ*, and *Argophyllum*; if they possess any use or property, it is unknown. By some botanists they are included among the Saxifragaceæ.

Brezo'wa, a market-town in the county of Neutra, Hungary, on the northern slope of the Carpathian mountains, 20 miles N.W. of Leopoldstadt. It is noted for its manufacture of leather, which is in request all over the Austro-Hungarian empire. Pop. (1869) 5886.

Brian Boroi'h'me (pronounced *borà*), an Irish king who held his court at Kincora, near Killaloe, during the early part of the 10th c. After repeatedly defeating the Danes, he dealt them a blow in the battle of Clontarf, in 1014, which irretrievably crippled their power in Ireland, but in which he himself was slain. He was surnamed *Boroi'h'me* (i.e., 'tax') from imposing a tribute on his subject provinces.

Brian'gon (Lat. *Brigantium*), a strongly fortified town in the department of Hautes-Alpes, France, on the Durance, 42 miles S.E. of Grenoble, and commanding the road to Turin by the Mont Genève pass. It is 4300 feet above the sea, being the highest town in France, and has some export trade in talc and cutlery. B. is a fortress of the first rank, the great arsenal and entrepôt of the French Alps, and its approaches are defended by seven forts and many redoubts. Pop. (1872) 1465; with garrison, 3698.

Briansk, a town in the government of Orel, Russia, on the right bank of the Desna, 70 miles W. of Orel, with an imperial building-yard and cannon-foundry. It is surrounded by earthen fortifications, and is a depôt for the Black Sea trade. The exports are chiefly grain, hemp, and iron. Pop. 13,881.

Briare, a town of France, department of Loiret, on the right bank of the Loire, with some trade, chiefly in wine and wood. It is said to occupy the site of the ancient *Brivodurum*. The *Canal de B.* connects the Loire and Seine, and is the oldest canal in France, having been partly constructed by Sully, and completed in 1642. Pop. (1872) 3799.

Bribery is the giving, offering, or taking of a reward, so as to influence him who takes it in the discharge of his duty. The offence becomes especially heinous when it affects, or is intended to affect, the administration of justice. Happily in England this phase of the offence is almost unknown. We may the more

congratulate ourselves upon the purity of our Legislature as regards B., as the reverse was the case in comparatively recent years. In 1707 Sir Robert Walpole was appointed Secretary at War, and in 1709 Treasurer of the Navy. In 1712 he was found guilty by the House of Commons of 'breach of trust and notorious corruption,' for which he was expelled from the House and sent to the Tower. Regardless of this early lesson, the great minister continued to bribe members of the House of Commons wholesale to the end of his political career. We remember his cynical dictum, that while one man was unquestionably more virtuous than another, this only meant that he required a larger bribe than the other, and that 'all are to be bought;' but, as Macaulay says, 'We might as well accuse the poor Lowland farmers who paid black-mail to Rob Roy of corrupting the virtue of the Highlanders, as accuse Sir Robert Walpole of corrupting the virtue of Parliament.' But our satisfaction at the happy change in the morality of our House of Commons is diminished when we find that the avenue which leads to it is still often darkly stained with corruption, in which candidate and constituent are found to be participant. As respects the former, doubtless it is often difficult for him, with the purest intentions, to avoid contamination: agents must be employed, for whose acts the law holds him responsible; and the meshes of the law itself are often so contrived that in the hands of a scrupulous and subtle-minded judge it often requires the utmost wariness on the part of a candidate to avoid being caught in them. What constitutes B. is plainly a question to which no definite answer can be given. Each case must largely depend on its own circumstances. Thus, a proprietor of land who concedes to his tenants a right to shoot hares and rabbits before a dissolution of Parliament is announced may be held immaculate as a candidate; but a proprietor conceding the same right after the dissolution has been found, by so doing, guilty of B. The immense sums generally spent on elections testify to the prevalence of this disease of our representative system—a disease from which Scotland is almost free. B. at an election for Parliament is an offence at common law, punishable by fine and imprisonment; and Parliament has at various times endeavoured by statute to strengthen the power of the law. The Corrupt Practices Prevention Act of 1854 inflicts penalties on bribing, treating, and undue influence. Its provisions are most stringent. Under the Corrupt Practices (Municipal Elections) Act, 1872, B. at a municipal election is severely punishable. By the Customs' Consolidation Act, the bribing or corrupting of any officer of customs or excise makes the offender liable to a fine of £200.

Brick is clay moulded into suitable forms, either with or without mixture with other ingredients, and dried. It was one of the very earliest materials used in building. Bricks dried in the sun seem to have been used at first in Egypt, Assyria, and other Eastern countries, but in the ruins of Babylon kiln-burnt bricks have also been found in plenty. The author of Genesis xi. seems also to have been familiar with them. The Romans carried the art of building in B. to great perfection, as is abundantly evidenced by the remains of some of their erections, and they introduced it into this country. Their bricks differed in form altogether from those at present in use, which first appear about 500 years ago.

The clays of this country are very numerous. They are chemical compounds of silicates of alumina, either alone or with silicates of potash, lime, iron, &c. Clay and sand mechanically mixed, as they often occur, are called *loams*, and clay and carbonate of lime, *marls*. The simplest clays—those composed almost entirely of silicates of alumina—are almost infusible, and are known as fire-clays. Of these, the Stourbridge Clay, occurring beneath the coal, is one of the most famous. The clays containing the other oxides mentioned above are less refractory. Ferric oxide seems to add to the strength and hardness of bricks, and it gives them in burning various colours, from red to blue-black, according to the proportion in which it exists in the clay. Clays containing lime and no iron burn white, and require less heat than any other kind to harden them. The bricks made from them are not, however, so strong or durable.

Every kind of clay has the property of absorbing water and forming a paste with it: this can be dried by long exposure to a high temperature, and the mass then shrinks and hardens. The purer the clay the more it shrinks, cracks, and warps in drying, for which reason the best clays cannot be used alone, but are mixed with sand, 'breeze,' or some other material which will counteract this.

The method of making-bricks varies very much in different parts of the country, but the following will give a general idea of the process. The clay is dug in autumn (this is called 'clay-getting'), heaped on a level place some feet thick, and left to disintegrate during the winter ('weathering'). In April it is turned over and 'tempered,' either by spade or in a 'pug-mill.' 'Tempering' consists in bringing the clay (mixed, if necessary, with any of the materials mentioned above) to a homogeneous paste. Sometimes it is necessary to grind the clay under rollers about this stage of the process, to make it thoroughly fit for the moulding, the next operation. This used to be done by hand, one B. at a time; but the demand for bricks has increased so rapidly, that machines are now constantly used for that purpose. A machine will mould bricks at the rate of twenty or thirty per minute. The bricks are then air-dried in 'stacks' for a considerable period, and lastly burnt. The burning is carried on either in *kilns*—which are essentially large open B. chambers with flues underneath them—or in *clamps*, in which the bricks are erected into a huge stack, in which the courses of B. are separated from each other by layers of breeze, which serve as fuel for the operations. For brick-making on a very large scale (as, e.g., the Metropolitan Railway), Hoffman's circular kiln has been employed with great economy and success.

'Marls' or 'Malms' is the name given to the best bricks; 'seconds' are an inferior quality of Malms; Red stock (kiln-burnt) and Grey stock (clamp-burnt) bricks are the kinds commonly used; Place bricks are an inferior kind.

Brickwork.—The principal points in the construction of brickwork are that the different 'courses,' or layers of bricks should have surfaces truly horizontal in both directions; that the face and back of the wall should be accurately 'plumb' (unless specially required to have some slope or 'batter'); that as few half-bricks or 'bats' as possible should be used; that the vertical joints of two consecutive courses should as seldom as possible lie in the same plane; and lastly, that the corresponding vertical joints in different courses should be exactly one above the other (this is called 'keeping the perpend').

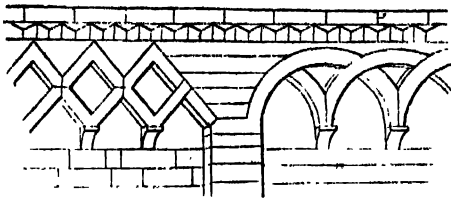
In order that the wall may have as great lateral stability as possible, it is constructed so that the bricks of each course cover the $\frac{1}{2}$ of the course below;—this arrangement is called bonding, or Breaking Joint (q. v.). Although there are a number of different bonds, only two, the English and the Flemish bonds, are used to any great extent. The former is the stronger and better, and although it is not often used in this country, it is almost universal in Holland and the Low Countries; the latter is considered more ornamental, and is that most commonly used in England, while, oddly enough, it is unknown in the countries from which it takes its name. In English bond the bricks are laid in alternate courses of 'stretchers' (bricks placed lengthways in the face of the wall) and 'headers' (bricks placed lengthways across the wall). In Flemish bond each course consists of alternate stretchers and headers, the stretcher in one course coming over the header in the course below, and *vice versa*. The details of the bonding vary with the thickness of the wall, which again is determined by the dimensions of the bricks used. These are approximately 9 inches long, $4\frac{1}{2}$ inches broad, and about $2\frac{1}{4}$ inches thick; and walls constructed with them are said to be 9-inch, 14-inch, 18-inch walls, &c., according as their thickness is one, one and a half, or two bricks, &c. The thickest walls commonly in use for houses are three-brick walls.

Bricks should be well wetted before they are used, and care should be taken to prevent excess of mortar being put in the horizontal joints, and to secure sufficient mortar in the vertical ones. To prevent the face of a wall absorbing moisture, and to give it a neater appearance, the joints are 'pointed,' that is, the mortar is scraped with a trowel from their outer edges, and its place supplied with cement or hydraulic mortar, both of which are impervious to water. In cases where especially good work is required, bricks are set in cement throughout instead of in mortar. The small B. arches over windows and doors are very frequently set in putty, and constructed of bricks made specially to the form required.

In engineering contracts, quantities of brickwork are commonly stated in cubic yards; for house-work the *rod* is often used as a standard. This is equal to $30\frac{1}{2}$ square yards of a wall one and a half B. thick, or about $11\frac{1}{2}$ cubic yards.

The accompanying illustration is a diamond-shaped frieze in

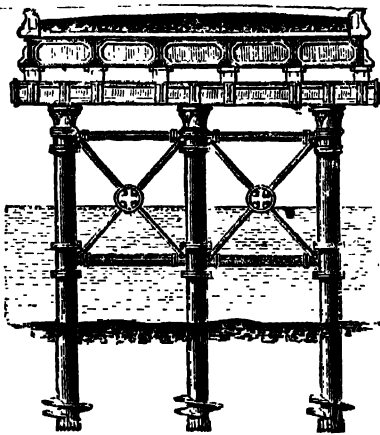
brickwork from Ratzeburg Cathedral, taken from Lubke's *Ecclesiastical Art in Germany*.



Frieze from Ratzeburg Cathedral.

Bride'well, literally the Well of St Bride, has given name in turn to a palace and a house of correction in Blackfriars, London. The former, built in 1522 by Henry VIII., was gifted in 1553 by Edward VI. to the city of London as a workhouse for the detention and correction of vagrants and disorderly persons. It was placed under the charge of the Lord Mayor and corporation of the city. A new House of Correction has been erected for London in the present reign.

Bridge (Old Eng. *brycg*, Low. Scot. *brig*, Fris. *brigge*, Dut. *brug*, Swed. *bryggan*, Ger. *brücke*), a structure for carrying a road or railway across a river, ravine, another road or railway, or any other such impediment to its course. The earliest bridges seem either to have consisted simply of stones or piers, having the spaces between them spanned by large stones or pieces of timber, or else to have been slight platforms carried upon cords of rope or hide, or simply, as in Northern India and elsewhere, suspended cords carrying a cradle in which a man could be conveyed from one side to the other.



Iron Bridge.

Until the era of railways, with its accompanying development of engineering skill and extension of engineering possibilities, the arch remained for centuries the principal and almost the only form in which bridges were built. The arch seems to have been used for the first time in a B. about 127 B.C. in the Senators' Bridge at Rome, constructed by Caius Flavius. Some old writers speak of arched bridges being used by the Chinese long before this date, but there is no reliable information on the subject. For a long time the art of B.-building was kept alive in Europe by the Romans, and from the fall of the empire until the 12th c.—the time of the B.-building Brotherhoods (q. v.)—it made little progress, the only important bridges erected being some built by the Moors in Spain. After this, the art again languished until the beginning of last century, since when it has made rapid and still continued progress. The first iron B. in this country was a cast-iron arch of 100 feet span across the Severn at Coalbrookdale, which was built in 1777. Twenty years later than this, iron suspension bridges of some importance were constructed in America, and during the

early part of this century iron became increasingly used for arches and suspension bridges.

There are three principal types of B.—the arched B., the suspension B., and the girder B. In order that an arch may be stable, its abutments have to be sufficiently strong to resist a great lateral thrust; and, in the same way, 'anchorage' on shore must be provided to resist the pull in the chains or cables of a suspension B. Neither of these structures, therefore, contains within itself the means of resisting the stresses caused by its own weight and the load upon it. The girder, on the other hand, is an *independent* structure, needing no anchorages or abutments, but simply piers strong enough to bear its own weight resting vertically upon them, and has its different members so formed as to resist all the internal stresses just mentioned. Cast-iron girders were early used for small railway bridges, up to 40 feet span; but besides that this was practically the limit up to which such girders could be constructed, cast-iron is a metal eminently unadapted for use in girders. The use of wrought-iron girders made of plates riveted together marks the most important epoch in the history of modern B.-making. Such girders seem to have been employed on a small scale—as joists for flooring—as early as 1832, but the applicability of the system to bridges was not recognised at the time. Under the heading BRITANNIA TUBULAR BRIDGE will be found a statement of the reasons which compelled Robert Stephenson, in designing that structure (the first wrought-iron girder B.), to depart from all precedent, and choose a form previously quite untried. The success of this B. has determined the material and the type of the vast majority of railway bridges since constructed, wrought-iron girders being now almost universally employed. The exact form first adopted by Stephenson has not, however, been found the most advantageous; it is not economical of material, nor does it possess a greater degree of stability than other types. Instead of one great tubular girder, several small 'box-girders' were used, carrying a platform upon which the rails were placed. From this the 'plate-girder' was developed, by the substitution of a single web for the two sides of each of the 'boxes.' The solid web is now generally superseded by a network of Braces (q. v.), some of which are in tension (ties), and some in compression (struts), by which means greater economy of material can be secured. This form of girder is called a 'lattice-girder,' and is frequently used; it seems to have been suggested as early as 1824, and was used in America before our engineers employed it.

The structures of masonry or iron, or both, which support the ends of girders, and support and receive the thrust of arches, are called piers. The use of iron in these piers, and in the substructure of bridges generally, marks almost as great and important a change as its use in the superstructure. Piers may either be (a) altogether of masonry, (b) of masonry or concrete, surrounded with a shell of iron to render their construction more easy; (c) of iron filled up (wholly or partially) with masonry or concrete to give additional stability. Clusters of screw piles are also used as piers in some cases—these are entirely of iron. The principal methods used in excavating foundations for bridges and erecting piers below the water-line are the following:—(a) By enclosing the whole space in a water-tight *coffer-dam* or enclosure, from which water can be pumped, and in which the men can work. (b) By sinking iron cylinders, by dredging the soil from their interior and weighting them with stone or iron. These cylinders form either the pier itself or a permanent casing for it; they are made in lengths, additional lengths being added as the sinking takes place, so as to keep the upper cylinder always above high-water mark. (c) By what is known as the pneumatic method. Here the lower part of the cylinder is converted into an air-tight Caisson (q. v.), and supplied with compressed air by pumps. Men can then work in it, removing boulders, soil, &c., just as in a diving-bell. This method has been used in America for the construction of the foundation of the St Louis B. at a depth of 120 feet below high-water mark, when the men worked under a pressure of 50 lbs. per sq. inch in addition to the pressure of the atmosphere. A day's work under these circumstances was limited to two spells of three-quarters of an hour each.

See also ARCH, BOWSTRING GIRDER, COFFER-DAM, CAISSON, PILES, LATTICE GIRDER, and SUSPENSION BRIDGE.

Bridge-Building Brotherhoods, religious fraternities which originated in the S. of France, and are said to have been

founded by a shepherd, Benezet, afterwards canonised, to whom is attributed the construction of the bridge at Avignon (1176-88). Their objects were to build bridges, maintain ferries, and establish hospices near the most frequented fords and crossings.

Bridge of Allan. See ALLAN.

Bridgeport, a rapidly increasing seaport of Connecticut, U.S., on an arm of Long Island Sound, at the mouth of the Pequonnock, 58 miles N.E. from New York, has manufactures of leather, machinery, sewing-machines, carriages, earthenware, and projectiles. It has also a brisk coasting trade, and engages in the whale fisheries. Pop. (1870) 18,969.

Bridge'st, St. properly *Birgit* or *Birgitta*, was born in Sweden, of royal blood, about 1302. Having been of a pious disposition all her life, on the death of her husband she divided his property among her eight children, and devoted herself to pious labours. After founding the double monastery of Wastain, she repaired to Rome, where, with visits to other parts of Italy and to Palestine, she spent the rest of her life. She died in 1373, and was buried at Rome, but her body was removed next year to Wastain. She was canonised in 1391, but as this was during the Papal schism, it was thought necessary to have it confirmed in 1415.—**Bridgid**, or **Bride**, a famous Irish saint, was born near Dundalk, 439-453. She was early distinguished for her wisdom, piety, and learning, and became a nun at the age of sixteen or seventeen. After a life spent in acts of piety and charity, including, it is said, many miracles, she died in 525, and was buried at Kildare, where she had founded a monastery.

Bridgeton, a town of New Jersey, U.S., situated on both sides of Cohansey Creek, 48 miles S. of Philadelphia. It possesses upwards of 15,000 tons of shipping, and has manufactures of woollens, iron, glass, nails, &c. Pop. (1870) 6830.

Bridgetown, one of the finest towns in the W. Indies, capital of the island of Barbadoes, on the W. coast, in Carlisle Bay. It has been four times destroyed by fire, and once (1780) by hurricane. Pop. 21,384. The Bishop of Barbadoes and the Governor-General of the Windward Islands reside here.

Bridgewater, Francis Egerton, third Duke of, the 'father of British inland navigation,' was born 21st May 1736. With the help of James Brindley, the engineer, he in 1758-61 constructed, under parliamentary powers, the first navigable canal in Britain, which connected his coal measures at Worsley with Manchester, crossing the Mersey and Irwell Navigation by an aqueduct 39 feet above the water, and 200 yards in length. The effect was to reduce by one-half the price of coal in Manchester. He next constructed a canal from Manchester to Runcorn on the Mersey, which, joining the Grand Trunk Navigation at Preston Brook, connects Manchester with Birmingham as well as Liverpool. The Duke and his brother-in-law, the Marquis of Stafford, were the chief promoters of the Grand Trunk. The Duke was remarkable for perseverance and for simplicity of life. He died 8th March 1803. See Phillip's *History of Inland Navigation*.

Bridgewater, Francis Henry Egerton, eighth Earl of, born 11th November 1756, is chiefly to be remembered as the testator who left £8000 to be held at the disposal of the President of the Royal Society of London, to be paid to the person or persons nominated by him who should write, print, and publish 1000 copies of a work on the power, wisdom, and goodness of God, as manifested in the creation. The President, Davies Gilbert, divided the work into eight portions, which he assigned to the gentlemen mentioned in next article. B.'s will was dated 25th February 1825. He died 25th February 1829.

Bridgewater Treatises, The, consist of the eight following works, which had at one time great popularity, but which the modern theory of development has tended unduly to discredit:—

1. *The Adaptation of External Nature to the Moral and Intellectual Constitution of Man*, by Rev. Thomas Chalmers, Professor of Divinity, University of Edinburgh (1833).
2. *Chemistry, Meteorology, and the Function of Digestion, considered with Reference to Natural Theology*, by William Prout, M.D. (1834).
3. *On the History, Habits, and Instincts of Animals*, by Rev.

William Kirby (1835). 4. *On Geology and Mineralogy*, by Rev. William Buckland, Professor of Geology, University of Oxford (1837). 5. *The Hand, its Mechanism and Vital Endowments, as Evincing Design*, by Sir Charles Bell (1837). 6. *On the Adaptation of External Nature to the Physical Condition of Man*, by John Kidd, M.D., Regius Professor of Medicine, University of Oxford (1836). 7. *Astronomy and General Physics, considered with Reference to Natural Theology*, by Rev. William Whewell (1839). 8. *On Animal and Vegetable Physiology, considered with Reference to Natural Theology*, by Peter Mark Roget, M.D., Secretary to the Royal Society. A survey of the animal, vegetable, and mineral kingdoms was suggested in the trust deed, and the human hand and the digestive functions were specially mentioned. The authors received each the profits of his own work as well as the sum of £1000. Cheap editions have been issued by Bohn. The line of argument, which is legitimate enough for the purpose of defending natural theology, is one which is now generally repudiated by comparative physiologists.

Bridgman, Laura Dervey, was born in Hanover, New Hampshire, U.S., in 1829. When two years old she lost both sight and hearing, but, under the care of Dr Howe of Boston, acquired the power of reading and speaking with her fingers, and subsequently received instruction in history, geography, and algebra. She has become a skilful teacher of the blind, deaf, and dumb. See *Life and Education of L. B.* (Lond. 1878).

Bridgnorth, a town of Shropshire, on both sides of the Severn, 20 miles S.E. of Shrewsbury, and a station on the Shrewsbury line up the valley of the Severn. Two of its churches are fine, and the town has about twenty exhibitions to Oxford. Pop. (1871) 5876. B. is the seat of a thriving trade in corn, malt, &c. It has large flour-mills and tanneries, manufactures of carpets and rugs, worsted-mills, &c. As its name implies, it was originally a bridge over the Severn, and is a very old town. It has been subjected several times to the horrors of war, being besieged and taken successively by Henry I. and Henry II., the latter of whom almost destroyed its castle, which belonged to the Earls of Shrewsbury. B. was the birthplace of Bishop Percy, and of the less admirable Francis Moore, author of a once famous almanac of the prophetic sort.

Bridgwater, a seaport of Somersetshire, on both banks of the Parret, 12 miles from its entrance into the Bristol Channel, and 30 S.W. of Bristol. The name is said to be a corruption of 'Bridge of Walter,' a Norman follower of the Conqueror, to whom the place was given. B. is certainly a very old town, and formerly had a massive castle, erected in the reign of King John, and dismantled in 1645 by General Fairfax during the civil wars. The Duke of Monmouth was proclaimed king at B. just before the battle of Sedgemoor (1685), and the inhabitants suffered severely at the hands of Judge Jeffreys and Colonel Kirke. The river, here crossed by a bridge, is navigable for vessels of 200 tons, but is subject to a 'bore' or tidal wave, six feet high, by which the shipping is often damaged. B. possessed 154 vessels of 10,140 tons in 1874, and 4686 vessels of 240,437 tons cleared the port. Pop. (1871) 12,101.

Bridlington, or Burlington, a seaport town in the East Riding of Yorkshire, N. of B. Bay, S. of Flamborough Head, and about 40 miles E.N.E. of York. It is a station on the Scarborough, Bridlington, and Hull section of the North-Eastern Railway, and has some export trade in corn, malt, and bones. B. (the name was once written *Brellington*) is very old. There are many traces in the neighbourhood of conflicts between the Danes and the English—tumuli, earthworks, &c. The ruins still exist of a once wealthy priory, founded by a grand-nephew of William the Conqueror. B. is also noted geologically; and in the lacustrine deposits in its vicinity were found the bones of a large extinct elk, whose branching horns measured eleven feet between the extremities.

Bridport, an old town and port of Dorsetshire, situated at the junction of the rivers Asker and Brit or Bride, 2 miles above the entrance of their joint stream into Lyme Bay, 24 miles W. of Dorchester by railway. It has considerable manufactures of twine, cordage, sailcloth, &c., and some shipbuilding. In 1873 there entered the port 69 vessels of 6386 tons, and cleared 36 of 3526. The sandy cliffs near B. present a fertile field for the geologist. Pop. (1871) 7670.

Brief, a word in the practice of the English bar, denoting the summary of his client's case made out by his solicitor for the instruction of counsel. A B. is also any writing issued out of the superior courts commanding something to be done in judicial course. There is also a Church-B., or Queen's Letter, authorising a collection for a special charitable purpose.

Brief or Breve, Papal, is a term used to denote an official communication of the Pope, regarding matters not considered of sufficient importance to require consideration from a conclave of cardinals—such as dispensations, releases from vows, &c. More important matters are disposed of by the Papal Bull. (See BULL.) The B. differs from the Bull in detail of form. The former is dated 'from the day of the Nativity,' and is written in modern Roman character on the smooth side of the parchment. The latter is dated 'from the day of the Incarnation,' and is written in ancient Gothic character on the rough side of the parchment.

Brieg (Slav. 'the ridge'), a thriving commercial town in Prussian Silesia, on the Oder, 27 miles S.E. of Breslau by railway. It has a Church of St Nicholas, built in 1287, four other churches, an old castle, and manufactures of linens, woollens, leather, and tobacco. It has also an active transit trade and important cattle-markets. Pop. (1872) 15,372, of whom 1109 are military. Near B. is the village of Mollwitz (pop. 645), the scene of an important battle, April 10, 1741.

Brielle' (properly *Brede-Hil*), a fortified haven of the Netherlands, province of South Holland, on the island of Voorne, near the mouth of the Maas, 14 miles W. of Rotterdam. It is notable on account of its association with the founding of the Dutch republic and the expulsion of the Spaniards, its capture by William de Marck (1572) being the signal of revolt against Philip II. B. was (1585-1616) one of the towns which formed a security to England for sums advanced to the States. It was also the first town of Holland which in 1813 freed itself from the French yoke without assistance. B. is a town of pilots and fishermen, and has a good harbour. Pop. (1874) 4068.

Brienne' Napoléon, a town in the French department of Aube, situated on the Aube, 19 miles W.N.W. of Troyes. It is formed of two parts, *B.-la-Ville* and *B.-le-Château*, and is a place of great antiquity. The old castle of B. was replaced in the 18th c. by a more imposing building. The town has an educational convent founded by the Minims in 1625, which was transformed in 1776 into one of the twelve military schools of France. Here Napoleon I. received his early training (1779-84) under Pichegru. But B. is chiefly noted as the scene of a bloody conflict between the Prussians under Blücher and Napoleon (29th February 1814), in which the town was almost entirely burned. Pop. (1872) 1850.

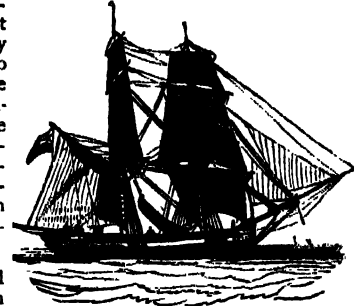
Brienzy (*brenitia*, 'thicket' or 'copse'), a town of Switzerland, canton of Bern, at the foot of the Rothhorn, and on the N. shore of the lake of B., to which belong the best of Swiss wood-carvers, and the handsomest of fisher-maids. Pop. (1870) 2605. The lake of B., 8 miles long, 2 broad, and 856 feet above the sea-level, is an expansion of the Aar. In parts it is fully 2000 feet deep. The Giessbach Fall and other picturesque cascades, and the magnificent views to be had from the surrounding mountains, make the lake a favourite resort of tourists, for whose accommodation a steamer plies between B. and Interlaken. The Rothhorn towers above B. to the height of 7710 feet.

Brierly Hill, a market-town and ecclesiastical district in Staffordshire, England, 2 miles N.N.E. of Stourbridge. The district abounds in coal, iron, and fire-clay, and consequently collieries, ironworks, &c., are numerous. Pop. (1871) 11,046.

Briec, St., a seaport and episcopal city, near the mouth of the Gouet, department of Côtes-du-Nord, France, 97 miles N.N.W. of Nantes, and 250 W.S.W. of Paris by railway. Its principal building is a cathedral of the 13th c. The site of the ramparts, demolished in 1788, now forms a charming promenade planted with lime-trees. The town is said to have risen round a monastery built here in the 5th c. It possesses shipbuilding-yards, and has manufactures of linen, woollen stuffs, and leather, and extensive cod and oyster fisheries. Pop. (1872) 10,718.

Brieve, or Breve, is in Scotch law a writing issuing from Chancery (q. v.) in the name of the sovereign, addressed to a

judge, ordering trial to be made by a jury of certain points stated in the B. These writs seem at one time to have been the foundation of almost all civil actions in Scotland; but it is in the appointment of tutors to minors, in inquiries as to lunacy, in ascertainment of Widow's Terce (q. v.), and in dividing property among Heirs-Portioners (q. v.), that briefs are now chiefly in use. There was also the B. of Inquest, the object of which was judicially to ascertain the heir of a deceased person; but for this purpose the form of procedure is now by petition of service. See SERVICE.



Brig.

Brig, the general term for a vessel with two masts, having a boom-mainsail, and otherwise square-rigged. B. is perhaps an abbreviation of Brigantine (q. v.).

Brigade' (Ital. *brigata*, a company, troop, crew), a military term meaning a temporary grouping of regiments or battalions in the field into one body. Two of these may form an infantry B.; but three or more are quite common. A cavalry B. consists usually of three regiments; but the famous charge of the Light B. in the Crimean war was made by five—the 4th and 13th Light Dragoons, the 8th and 11th Hussars, and the 17th Lancers. The Royal Artillery Regiment (q. v.) is divided into brigades and batteries; a B. usually comprising eight batteries of horse, ten of field, or seven of garrison artillery. The phrase 'Household B.' extends to the Life Guards, the Royal Horse Guards, or Blues, and the Foot Guards. The word B. has acquired a very precise signification by the Army Reorganisation Act of 1872. It consists of two line battalions of the regular infantry, and the militia and volunteers of the B. district. See BATTERY and MILITARY DISTRICT.

Brigade Major, an officer, usually chosen from among the captains on the field, to convey orders, inspect pickets, and keep the Roster (q. v.). He also superintends exercises and evolutions while in discharge of his temporary duties. By the new Army Act of 1872, a B. M. is appointed to each of the three infantry brigades and one to the cavalry brigade permanently associated with the Aldershot military district.

Brigadier-General, or **Brigadier**, a temporary rank in active warfare, in which a colonel or lieutenant-colonel is made a general officer in command of a Brigade (q. v.) for a special service. It is considered a step towards being made a major-general. Each of the three infantry brigades permanently associated with the Aldershot military district by the Army Act of 1872 is commanded by a B.-G.; the cavalry brigade being under a major-general.

Brigandine, a kind of scale-armour, consisting of an assemblage of iron plates sewed upon a quilted linen or leather tunic, and covered with the same material. It was worn by the Brigans—the name of the light troops or skirmishers of the middle ages, derived from the Low Latin *briga*, strife.

Brigantes, the largest of the early British tribes, held nearly all the country between the Humber and Hadrian's Wall, Yorkshire, and the northern English counties. Eboracum (York) was their capital.

Brigantine, a small vessel, partly square-rigged and partly schooner-rigged; from Ital. *brigante*, a pirate, hence originally a piratical cruiser.

Briggs, Henry, a distinguished mathematician, was born at Warleywood, near Halifax, in 1556, and died January 26, 1631, at Oxford, where he had held since 1619 the Savilian chair of Geometry. B.'s great work was his practical improvement upon Napier's system of Logarithms (q. v.). He published in 1624 his *Arithmetica Logarithmica*, and his *Trigonometrica Briannica* was published in 1633 after his death.

Bright, John, a great English politician and orator, was born November 16, 1811, at Greenbank, near Rochdale, Lancashire, where his father, Mr Jacob B., was a cotton-spinner and manufacturer. B. first showed his powers as a speaker by lectures he delivered before a literary institution in Rochdale. The formation of the Anti-Corn Law League, in 1839, brought him into prominence; he joined it, and was soon recognised as the chief orator in it, and, after his friend Cobden, its leading spirit. He entered Parliament in 1843, as member for Durham, his opinions being those of an advanced Liberal and financial reformer. In 1847 he was elected for Manchester, which he represented for nearly ten years. Being rejected in a contest which took place in his absence on the Continent, he was returned in 1857 for Birmingham, and still continues one of its members. Both in Parliament and out of it, B. has been known as the opponent of protection, and the advocate of parliamentary reform. For many years he took a great part in agitations throughout the kingdom for household suffrage, and these may be said to have been crowned with success by the passing of the Reform Act, 1867, forced upon the Conservative Government by the previous action of their opponents. We may mention among the incidents of B.'s parliamentary life, his opposition to the game-laws, his denunciations of the Crimean war, his support of the motion against the second reading of the Conspiracy Bill, which, in 1857, overthrew the Government of Lord Palmerston, his exertions on behalf of the natives of India, and the aid that he gave to the movement which resulted in the disestablishment of the Irish Church. When, after the general election of 1868, Mr Disraeli retired from office, and Mr Gladstone became Premier, B. was appointed President of the Board of Trade. Ill-health, however, compelled him to resign this post, and to retire from active life. Recovering his health, B. was able in 1875 to reappear in Parliament. In the same year he took the chair at the meeting of Liberal members of Parliament which unanimously elected the Marquis of Hartington as successor to Mr Gladstone in the leadership of the Liberal party in the House of Commons. Like his father, he is a member of the Society of Friends, although he has abandoned those peculiarities of speech by which Quakers are usually known. A Selection from the *Speeches on Questions of Public Policy* of B. was published in 2 volumes in 1868, under the editorship of Professor Thorold Rogers. See Robertson's *Life and Times of the Right Hon. J. B.* (Roch. 1878).—**Jacob B.**, a younger brother of B., was for many years one of the representatives of Manchester in Parliament, where he took the management of a bill for the removal of the electoral disabilities of women. He was rejected by Manchester at the general election of 1874, and returned in 1876.

Bright's Disease, a name given somewhat vaguely to any disease of the kidneys, of which the most marked symptoms are albumen and dropsy. It is so named after the distinguished physician who first described it. B. D. is generally applied to an affection of the kidneys, which consists essentially of a disease of the cells lining the tubes of the kidneys, in which these cells become altered, and speedily desquamate, and thus obstruct the tubes. This causes serum and fibrine to be exuded into the urine, and hence when heat is applied to such urine it becomes white and thick, owing to the coagulation of the Albumen (q. v.) contained in it. The urine becomes scanty, of a dark colour, and frequently contains casts of the tubes and cells. On account of the functions of the kidneys not being properly performed, serum is poured into the various cavities of the body and into the cellular tissue, producing local and general dropsy, with a swollen and puffy face. This disease is generally ushered in with shivering, headache, thirst, pain in the small of the back, and vomiting. It may be caused by intemperance, exposure to wet and cold, &c. It frequently follows scarlet fever. Treatment consists in warm clothing or confinement to bed, low diet, plenty of milk, barley-water, &c., poultices or hot fomentations to the loins, with a dose of purgative medicine, as jalap or scammony. After a few days, steel drops, quinine, and other tonics may be given. The above affection is often called *acute B. D.* There is also a *chronic* form of B. D., sometimes called *gouty kidneys*. This disease comes on slowly, may be the result of acute B. D., but is more frequently the result of *gout* or some allied affection. Here iron tonics will be of great benefit. A common result of B. D. is the retention of *Urus* (q. v.) in

the blood, producing convulsions and death. (See *URÆMIA*.) Both forms of B. D. are very serious affections, and the advice of a physician should be had at once.

Brighton (formerly *Brightelmstone*, and originally *Brihtelmestun*), a fashionable watering-place on the coast of Sussex, 50 miles S. of London by rail, lies on a slope, and is sheltered by the cliffs of the S. Downs. It is handsomely built, extending along the shore upwards of 3 miles, and has a beautiful beach, and many popular attractions. The chief of these is the aquarium (opened in 1872), which stands below the cliff of the Marine Parade, and has a length of 715 feet and a breadth of 100. It has three corridors and over fifty tanks, ranging from 11 to 100 feet in length, and there is also a magnificent conservatory, fitted up as a lounge. B. has two piers, a wooden one raised on piles (1865-66), and a chain-pier (1134 feet long and 13 wide), which, together with the 'parades,' afford ample scope for promenading. The principal building is the Pavilion or Marine Palace, a partly graceful, partly grotesque pile of domes, minarets, and pinnacles. It was originally built for George IV. (1784), but was bought for £53,000 by the corporation (1849), who have opened it and its beautiful pleasure-grounds to the public as places of recreation. B. has also the N. Steyne Enclosures, the Lovel, and the Queen's Parks. There is, however, a scarcity of trees everywhere, owing to the adverse sea-breezes. The town has no important trade, but derives its revenues from the ceaseless influx of holiday visitors. There are numerous splendid hotels, boarding-houses, and schools. B. sends two members to Parliament. Pop. (1877) 100,638.

Brignoles, an old town of France, department of Var, on the Calami, 23 miles W.S.W. of Draguignan. It has an antique palace of the Counts of Provence, an old house of the Templars, and a beautiful building bearing date of the 12th c. There are manufactures of silks, broadcloth, brandy, soap, leather, &c., and trade in wines, prunes, and other fruits. Pop. (1872) 4626.

Brihuega, an old and once walled town of New Castile, Spain, on the Tajúña, 20 miles E.N.E. of Guadalajara. It has manufactures of linen, woollens, glass, leather, &c. Pop. 4500. Here, in 1710, the English general Stanhope was compelled to surrender to the Duc de Vendôme.

Bril, Mattheus and Paul, two Flemish painters. Mattheus, born at Antwerp in 1550, removed to Rome and laboured in the galleries of the Vatican, where he painted several frescoes. He died in 1584. Paul B., his younger brother, but the greater artist, was born at Antwerp in 1556. He was a follower of Titian and Annibal Carracci. His works, conspicuous for their fine sky-lights and for their air of rest and solemnity, are to be met with in the Louvre, at Dresden, Florence, Düsseldorf, &c.; but his masterpieces are at Rome. His 'Martyrdom of St Clement,' a fresco 68 feet long, is in the Pope's gallery, Rome. He also painted landscapes of exquisite delicacy and finish on copper. B. died at Rome in 1626.

Brill (*Rhombus vulgaris*), a species of *Pleuronectidae*, or 'flat-fishes,' belonging to the turbot genus (*Rhombus*), in which the eyes are on the left side of the head, teeth existing in the jaws and throat, and the dorsal fin commencing in front of the eyes. These fishes, it is to be noted, are only *flat* in the sense that the sides of the body are more compressed than in other fishes, and both eyes, by the twisting of the bones of the head in early life, come to be placed on one side of the head. The B. averages about six or eight pounds in weight. It is not so broad as the turbot, and is coloured sandy or reddish brown on the upper side, spotted with white. The B. forms a characteristic British food-fish.

Brilliant, the name given to a diamond when cut in a particular form which displays its lustre to the best advantage. See DIAMOND.

Brimstone (formerly *brinstone*, from Old Eng. *byrnan*, to burn), the commercial name for sulphur in sticks or rolls.

Brindisi (anc. *Brundisium*), a rapidly-increasing seaport in the province of Lecce, S. Italy, on the coast of the Adriatic, 70 miles S.E. of Bari by railway. It lies between two headlands at the mouths of the Patricio and Masina, is surrounded by walls and bastions, and protected by the island-fort St Andrea. B. is the seat of a bishop, and has a splendid harbour and roadstead.

The harbour consists of an E. and W. inner dock, nearly surrounding B., and a strait passage or canal connecting these with the outer docks. These docks have been deepened, walled, and defended by the Government since 1866, and are now in an excellent state. In 1870, B. was made a port of embarkation in the English overland route, and in 1874 the chief Mediterranean coaling station of the Oriental and Peninsular Company. In 1874 there entered the port 940 vessels of altogether 310,186 tons, and cleared 939 of 380,069 tons; while the imports amounted to £363,000, exports to £172,400. The articles of import are chiefly Japanese silkworms' eggs, wheat, flour, coal, raw silk, and cattle; exports, dried fruit, manufactured silk, and coral, olive oil, wine, and jewellery. A marsh near B. (*Fiume Piccolo*), the cause of much malaria, was being drained and filled up in 1875. Pop. (1870) 9105. B. was in very early times a chief town of the Sallentines; and the Romans, having taken it in 267 B.C., made it a colony in 244, when it rose rapidly into wealth and importance, from the fertility of the territory and the excellence of its port both for commercial and naval purposes. It was called in the native dialect of the Messapians *Brention* or *Brentesion*, i.e., 'stag's head,' on account of the configuration of its harbour. The chief Roman naval station in the Adriatic, such was its importance, that Hannibal attempted unsuccessfully to seize it. The Roman generals embarked and disembarked here the troops that were to cross the Adriatic, as it was the most convenient point of communication between Rome and the eastern provinces. Pacuvius the tragic poet was born at B. about 220 B.C., and here Virgil died 19 B.C. The fall of the Latin Empire reduced the importance of the town. When the Normans wrested it from the Greek Empire, in the 11th c., it became the great port of embarkation for the Crusades. The haven was afterwards greatly destroyed by Duke Anton of Tarentum, and later by the Venetians. See Cora, *Da B. à Suez* (Casale, 1869); and Andree, *B. in seiner Bedeutung für die Ueberlandroute* (Stuttg. 1870).

Brindley, James, a great mechanic and engineer, born at Wormhill, in Derbyshire, in 1716. When forty years old his attention was turned to inland navigation in connection with the Duke of Bridgewater's canal between Worsley and Manchester, and the remainder of his life was devoted to this subject, the difficulties of which he grappled with and overcame as no one had done before him. B. died at Turnhurst, Staffordshire, 30th September 1772.

Brine is the name given to a strong solution of common salt in water.

Brine Shrimp (*Artemia salina*), a curious genus of Crustacea, belonging to the section *Branchiopoda* (q. v.), and to the order *Phyllopoda*. It derives its name from the fact that it inhabits the brine-pans of saltworks, and also occurs in natural salt lakes, as in the Great Salt Lake of Utah. In the Lymington salt-pans of England, these forms inhabit a briny solution of a strength sufficient to pickle beef. The feet are numerous, and bear the branchiae or gills, and during their development shrimps then undergo a definite *metamorphosis*, and multiply with great fecundity.

Brinvilliers, Marie Marguerite, Marquise de, notorious for her gallantries and crimes, was the daughter of Dreux d'Aubray, Municipal Lieutenant of Paris, and was married in 1651 to the Marquis de B., who introduced her to a handsome officer, named St Croix, for whom she conceived an uncontrollable passion. To separate the lovers, her father imprisoned St Croix in the Bastille, where he learned from an Italian named Exili the art of mixing poison. On his liberation he taught his mistress the fatal secret. She practised first on her father, who died in eight months; she then turned her art against her two brothers, and next against her husband the marquis. But he was saved by antidotes given him by St Croix, who, though he had no scruple in wasting in extravagance her paternal inheritance



Brine Shrimp.

with his mistress, is understood to have been unwilling to become her husband. St Croix became the victim of his own criminality, having died suddenly in 1672, from accidentally breathing the effluvia of a poison he was preparing. He left papers which pointed to the guilt of the marchioness, but she escaped to England, and afterwards resided for some time in a convent at Liege. Here she was captured and conveyed to Paris. Her sentence, that she should be beheaded and her body burnt, was carried into effect July 16, 1676. The poison used by B. is thought to have been common arsenic. See the *Histoire du Procès de la Marquise de B.* (Par. 1676).

Brioude (the ancient *Brivas*), a town in the department of Haute-Loire, France, situated near the Allier, 29 miles N.W. of Le Puy. The principal building is the Byzantine church of St Julien, originally built in the time of Constantine, and rebuilt in the 11th and 12th centuries. This structure is richly ornamented with the most delicate sculpture. B. has also beautiful fountains of the 13th c. There is a small lace industry, and a trade in wine and maize. Pop. (1872) 4484. B. was the birth-place of Lafayette.

Brisbane.—1. A county in the S.E. part of Queensland.—2. A river in Queensland, which, after a course first S. and then E. of 170 miles, flows into Moreton Bay (q. v.), in 27° 40' S. lat., 153° 43' E. long.—3. An episcopal city, the capital of Queensland, situated on both banks of number 2, about 25 miles from its mouth, in 27° 28' S. lat., 153° 6' E. long. It was founded as a penal settlement in 1825, but was not open to free settlers till 1842. It is pleasantly situated, the river being a quarter of a mile broad, and the scenery picturesque. B. is well laid out; among the principal buildings are the Houses of Legislature, which cost £100,000; the vice-regal lodge, post-office, and custom-house. The Victoria Bridge over the B. (1874) is 1013 feet long. None of the churches deserve notice. B. possesses some excellent charitable and educational institutions, and supports four newspapers, two of which are published daily. It is lighted with gas and well supplied with water. Vessels drawing more than 16 feet cannot come up to B., on account of the bar at the mouth of the river. Pop. (1871) 19,413. All the foregoing are named after the subject of the succeeding article.

Brisbane, General Sir Thomas Makdougall, G.C.B., was born at Brisbane House, Largs, 23d July 1773, entered the army in 1789, and served under the Duke of York in Holland, and under Sir Ralph Abercromby in the W. Indies. In 1812 he joined Wellington at Coimbra, and distinguished himself at Vittoria and Nives, his conduct in this last action procuring for him the thanks of Parliament. On the abdication of Napoleon, B. was sent to N. America in command of a brigade, but was recalled after the escape from Elba, though not in time for Waterloo. In 1816 he was elected a corresponding member of the Institute of France; in 1821, on the recommendation of the Duke of Wellington, he was appointed Governor of New South Wales, where he remained four years. His administration was marked by many wise reforms. At an observatory which he erected 14 miles from Sydney he catalogued 7385 stars previously little known, and for this he received the gold medal of the Royal Astronomical Society. On his return from Australia he erected an observatory at Makerstoun, adding a magnetic observatory in 1841. On the death of Sir Walter Scott in 1833, B. was elected President of the Royal Society of Edinburgh. He died 27th January 1860. (*Transactions of the Royal Society of Edinburgh*, vol. xxii. pp. 589-605.)

Brissot de Warville, Jean Pierre, one of the best of the French Revolutionists, was born at Chartres, 14th January 1754. Although educated for the bar he devoted himself to authorship, for which his passion for literary studies, particularly history, politics, and political economy, peculiarly qualified him. His *Bibliothèque des Lois Criminelles* gained him great reputation as a jurist, and his abilities were recognised by Voltaire and D'Alembert. His enthusiasm for freedom brought him under the suspicion of the French court, and he had to take refuge for a time, first in England and then in N. America. The outbreak of the Revolution, however, brought him back to Paris. He became the representative of Paris in the Constituent Assembly, and his patriotism and ability soon made him the real chief of the party

known as the Girondins. B., however, made a political mistake when he attempted to stem the tide of revolution and save the life of the King. Such was the agitation, credulity, and terror of the public mind, that to be moderate in those frenzied days was to court destruction. He and his party fell before the fiercer faction of the Mountain, and B. was guillotined October 30, 1793. B.'s treatises were published along with his *Mémoires* (1829-32) on political and social questions, but they are long forgotten.

Bristles are modifications of hairs found in various mammals. B. differ from hairs chiefly in the denser and firmer nature of their epidermis or horny outer cells. They are obtained chiefly from the backs of wild and domesticated swine, and are largely imported into Britain from Germany, Poland, Denmark, and Russia, for the purposes of the brushmaker. Russia is the great exporting country, the Ukraine B. being accounted of finest quality. The 'lily'-coloured B., used for making shaving and other soft brushes, are the most valued; other colours being black, grey, and yellow. In 1864 Britain imported from Russia 1,958,112 lbs., valued at £252,923; from Hamburg 207,274 lbs., worth £26,772; from France, Prussia, and other parts of Europe, 184,749 lbs., valued at £24,336. In 1867 the total import amounted to 2,378,526 lbs.

Bristol, a cathedral city, the third seaport of England, and the western commercial centre, forms a county in itself, and is situated between the counties of Gloucester and Somerset, 120 miles W. of London by railway. It lies partly in the sheltered valleys and plains of the Avon and the Frome, partly on rising ground and steep slopes, and gains from the irregularities of its position a singularly picturesque appearance. The site rises and falls on every side, and there is a difference of 300 feet between the highest and lowest levels. West from Bristol, and overlooking both the city and the Avon, lies the picturesque suburb of Clifton (q. v.). There is here a magnificent suspension-bridge over the Avon, 702 feet long, and 245 feet above the river at high tide. Some half-a-million sterling has been expended on recent city improvements in the older part of B., but a good deal still remains to be done in this way. B. has been called 'the city of churches,' and among its principal public buildings are the cathedral, which has recently received the addition of a beautiful nave, costing £40,000; Redcliffe Church, 'the finest parish church in England,' with its newly-completed spire and its muniment-room, in which Chatterton professed to have found the pseudo poems of Rowley; and the Temple Church, the peculiarity of which is its leaning tower. There are also some 150 other churches. Of other fine buildings may be mentioned Clifton College, erected in 1867, the B. General Hospital, Colston Hall, the West of England Bank, the Guildhall, a handsome theatre (1867), and the new Central Railway Terminus. The new 'University College, Bristol,' in 1878 had 418 students. The harbour has been greatly improved, and there are now (1879) a mile and a half of quays. In February 1877 the new Avonmouth Dock, of 16 acres, and costing £600,000, was opened. B. has manufactures of cotton and linen goods, chemicals, leather, floorcloth, and earthenware. There is also much sugar-refining, and an important shipbuilding industry. But it is as the seat of an old and extensive foreign commerce that B. has risen to importance. It long monopolised the W. Indian trade, in which one of the chief commodities was the African slave, and now possesses a rich share of British commerce. In 1873 there entered the port 1145 vessels in the foreign and colonial trade (408,999 tons), and 8208 coasting vessels (187,773 tons); cleared, 469 vessels in the foreign and colonial trade (650,072 tons), and 8391 coasting vessels (855,266 tons). Pop., as established by Registrar-General (1875) 196,186; (June 1877), 199,539. B. returns two members to Parliament. It is first mentioned in early records by the old British name of *Caer-ader*, and after being a Roman station, was re-occupied by the Britons, who were expelled in 584 by the English, by whom it was called *Bricgstow* ('the place of the bridge'), hence its present name. In these early times, even, it acquired a reputation for trade, especially in British slaves. In 1372 Edward III. made it an independent city and county, and it was constituted a bishop's see by Henry VIII. The *Bridge Riots* took place in 1793, but were far eclipsed by the famous *Reform Bill Riots* of 1831, in which some 500 persons were killed, and 100 houses burned, including the mansion-house, the prisons, and the bishop's palace. B. is the birthplace of Cabot the navigator, 500

Chatterton and Southey the poets, Bowdich the African traveller, and many other men of eminence. See *B. and its Environs*, by the Local Executive Committee of the British Association (Brist. 1875).

Bristol Bay, an inlet of the Pacific Ocean, on the N. side of the peninsula of Alaska, U.S. It receives a river of considerable size, on which there is situated a fort or station.

Bristol-Board is a kind of card-board used in sketching, and formed by pasting together two or more thicknesses of white paper.

Bristol Channel, the largest inlet in Britain, forming an expansion of the estuary of the Severn, and separating S. Wales from the N. coast of Somerset and Devon. It is about 80 miles long, extends from 5 to 48 broad, and receives a drainage area of 11,000 square miles. Numerous rivers enter it, the chief of which are the Severn, Avon, Axe, Parrot, Taw, Torridge, Towy, Taff, Usk, and Wye. The tide, which rises 35 feet at Bristol, 40 at King's Road, and occasionally 70 at Chepstow, flows so rapidly as to produce in the mouths of the rivers, and in the estuary of the Severn, the phenomenon of the *bore*, in which the water advances in a single wave some 8 feet in height.

Britain. See GREAT BRITAIN.

Britannia was the ancient name of S. Britain and Caledonia. Its derivation has been keenly disputed, and is still doubtful. The Celtic *brith* or *brit*, 'painted,' is extremely improbable. A Briton who painted his body would not call attention to the circumstance by a name. A foreigner might have done so, but he would hardly have used a Welsh word for the purpose. Isaac Taylor's supposition that the word is mainly Iberic or Basque, and merely signifies a country or district, does not seem a happy conjecture. Caesar invaded Britain in 55 and in 54 B.C. Plautius, Ostorius, and Vespasian under Claudius, and Suetonius under Nero, by their victories, especially those over Caractacus and Boadicea, subdued the southern and awed the northern Britons. In 61 A.D., Agricola, under Vespasian and Domitian, successfully led his legions into the N., secured his conquests by chains of forts between the Tyne and Solway, and between the Forth and the Clyde; penetrated beyond the Forth, sailed round the island, and closed his seventh campaign, A.D. 84, by the defeat of Galgacus at Mons Grampius. In 119 A.D., Hadrian drew the frontier of his dominions from the Tyne to the Solway, by strengthening the works of Agricola on that line; but in A.D. 139, Lollius Urbicus once more attempted to maintain the advanced frontier of the Forth and Clyde by strengthening the defences of Agricola. In 208 A.D., however, Severus retired on the old line of Hadrian, and threw up beside it a second earthen rampart. Thereafter, till their final withdrawal from B. in 410 A.D., the Romans ruled the southern portion of the island alone, and even there they suffered much from the unceasing inroads and cruel depredations of the Scots and Picts, and of the Saxons. At the beginning of the 5th c., B. was divided into five provinces, Maxima Caesariensis, Flavia Caesariensis, B. Prima, B. Secunda, and Valentia. These were governed by consulars and presidents, subject to the Vicarius, at Eboracum (York), the seat of the Roman government. At that time also there were ninety-two considerable towns, protected by the Romans, and of these thirty-three were cities; and the British Church might reckon thirty or forty bishops. The antiquities of B. are partly British and partly Roman. The former consist of barrows, earth-mounds, monoliths, cromlechs, and cairns; the latter, of pavements, altars; metal implements and ornaments, pottery, encampments, walls, roads, coins, and inscriptions.

Britannia Metal, a compound metal of a white, silvery aspect, of considerable malleability, extensively used for the cheaper class of tea-pots, spoons, hot-water jugs, &c. It is composed of equal parts of brass, tin, antimony, and bismuth. See **PEWTER** and **QUEEN'S METAL**.

Britannia Tubular Bridge, a bridge carrying the Chester and Holyhead Railway over the Menai Straits. It was designed by Mr Robert Stevenson, commenced in 1846, and completed in 1850. The difficulties in its construction were numerous, among which the principal were that the nature of the site rendered it necessary that the two principal spans should

each have a clear width of 460 feet, and that the parliamentary committee insisted that the under side of the roadway should nowhere be less than 103 feet above high-water mark. The latter condition rendered it impossible to use an arch, and it did not seem practicable to stiffen a suspension bridge sufficiently to render it safe for railway traffic. The girder bridges, now universally used, were unknown, and the theory of beams imperfectly understood. Under all these difficulties and disadvantages, Mr Stevenson conceived the idea of making the bridge of huge hollow beams, through the centre of which trains should run, and proved its practicability by an elaborate series of experiments on the strength of tubular beams, in which Sir William (then Mr) Fairbairn, Mr Eaton Hodgkinson, and Mr Edwin Clark took part. The tubes of which the bridge consist are made of wrought-iron plates riveted together (a method of construction then almost as novel as the design of the bridge), the top and bottom of the tubes being cellular. The four tubes composing the two centre spans each weigh about 1800 tons; they were constructed on shore, floated on pontoons to the piers, and then raised by hydraulic presses into their places at the rate of about 6 feet per day—the speed being limited by the rate at which brickwork could be built up underneath the tubes as they were lifted. The total cost of the bridge was over £60,000, and it was completed in less than five years.

Britannicæ Insulæ was the name given by writers earlier than Cæsar to the two large islands, Albion and Ierne, and the numerous smaller ones around them. Albion was England and Scotland; Ierne, Ireland. Cæsar first calls Albion Britannia, as opposed to Ierne. Ptolemy calls Ierne Little Britain; and Albion, Great Britain. Hence the legend on our coins, Britt., or Britanniæ. Reg.

British Army. The basis of the modern B. A. is the Bill of Rights, which became law in 1690, as the legalised form of that Declaration of Rights (q. v.) which the Prince and Princess of Orange accepted along with the British crown. It enacts that the raising and keeping up of a standing army in time of peace, without consent of Parliament, is contrary to law. From the time of the passing of that Act to the present, the number of troops required for the security of the kingdom, and its possessions and dependencies, as well as details of the cost of different branches of the service, has been sanctioned annually by a vote of the House of Commons. The Government of the day, from a political view of the state of affairs at home and abroad, fixes, at a meeting of the Cabinet, held shortly before the beginning of a parliamentary session, the amount of military service required for the coming year. The Secretary of State for War then frames his Army Estimates (q. v.), and these are discussed and finally settled for the year early in the session by the House of Commons. The Mutiny Act (q. v.), first passed in 1689, and which has to be annually renewed, supplies Parliament with another important means of controlling the B. A. Soldiers, in time of war or rebellion, being subject only to martial law, are obnoxious to that law for mutiny, desertion, or any other military offence, and may be punished by it accordingly. But when the army began to be maintained in time of peace, questions of discipline arose, and it was decided in the courts of law that, in the absence of any statute specially applicable to their circumstances, a soldier was amenable only to the common law of the country: if he deserted, he could be punished for breach of contract; if he struck his officer, he was liable merely to an indictment for assault. The authority of Parliament became, therefore, necessary for the maintenance of military discipline, and the Mutiny Act invests the crown with extensive powers to make regulations for the good government of the army, and to frame the articles of war which constitute the military code of laws. As to the supply of men to fill its ranks, the B. A. differs from that of nearly every other military power in Europe. Service in it is voluntary. Subjects of the crown, of their own choice, enlist in it for a specified number of years—twenty-one years' service securing a pension. The only service which is forced by ballot is in the Militia (q. v.). The following order of precedence, contained in the Army Regulations published in 1873, presents also the principal component elements of the B. A. The order of precedence of the several regiments and corps in Her Majesty's service is: the regiments of life-guards and the royal regiment of horse-guards; the royal horse-artillery; the cavalry of the line; the royal artillery; the royal engineers; the foot-guards; the infantry

of the line; the departmental corps. The royal marines, when acting with the troops of the line, take rank next to the 49th regiment. The rifle brigade ranks next to the 93d regiment. The militia regiments have precedence after those of the line, according to their respective numbers, as fixed by lot. There are, in addition to these, other component elements which do not remove the men, making them up from their rank as civilians. Besides the militia, there are the yeomanry cavalry, the volunteer artillery and rifles, the enrolled pensioners, and the dockyard battalions. The corps raised in and belonging to the principal colonies, and the troops maintained out of the revenues of India, also belong to the army of the British Empire, if not to the B. A. Under various laws of army reorganisation, which were completed in 1873, Great Britain and Ireland are partitioned into ten military districts, or general officers' commands, which are further subdivided into sub-districts, the division varying with the arms of the service. There are sixty-six sub- or brigade-districts for the infantry, commanded by line colonels; for the artillery there are twelve sub-districts, commanded by artillery colonels; and there are two districts for the cavalry, commanded by cavalry colonels. The brigade of an infantry sub-district consists, as a rule, of two line battalions—one generally abroad and the other at home—two militia battalions, the brigade depot, rifle volunteer corps, and infantry of the army reserves. An artillery sub-district contains, in addition to the royal artillery, the militia artillery, the artillery of the volunteers, and that of the army reserve. The cavalry colonel commands the cavalry regiments within his district, and also the yeomanry, volunteers, and reserve cavalry. (See DISTRICT, MILITARY.) The number of regiments in the B. A. has varied very little since 1820. There are at present (1875) 31 regiments of cavalry, 2 of artillery and engineers, and 113 of infantry—146 regiments in all. The number of men in the army is enlarged or lessened, not by embodying new regiments or disbanding any of those which exist, but by varying the number of battalions in a regiment, of companies in a battalion, or of men in a company. The effective numbers of the B. A. in 1874 were: officers, 9780; soldiers, 215,055; total, 224,835. There were 26,453 horses for men in the cavalry, and 4177 officers' horses: total, 30,630. The reserve forces—including the yeomanry cavalry, the militia, and the volunteers—counted 302,868 officers and men, with 19,420 horses. The total number of the regular army and the reserves in that year, then, was 527,702 men, and 50,050 horses. Arrangements were completed in 1875 for a complete mobilisation of the B. A. (See MOBILISATION.) The total cost of the B. A. for the year ending March 31, 1874, was £13,231,400. The establishments for educational purposes in the same year were reckoned in the army estimates to cost £133,930. These comprise the council of military education, the academy at Woolwich, the college at Sandhurst, the asylum and normal school at Chelsea, the military school at Dublin, the department for instruction of military officers, the military medical school, and a varying number of garrison schools and libraries.

British Association for the Advancement of Science is an association of scientists eminent in their several departments, and was primarily formed with the intention of giving an impetus to scientific inquiry and discovery, of publishing over the whole country the latest results of such research, and of exciting in the mind of the British public a desire for more thorough acquaintance with scientific facts and theories. The B. A. was established by Sir David Brewster, Sir R. J. Murchison, and others; but its conception and foundation must in great measure be ascribed to Brewster, through whose exertions the first meeting was held at York on September 27, 1831. At this meeting the society was divided into several sections, laws and bylaws passed affecting its constitution, its next place of meeting determined, and subjects proposed on which reports were then to be read. The president delivers an inaugural address, which is usually an enumeration and criticism of the latest and most striking discoveries. The place of meeting for 1876 is Glasgow (for 1877, Plymouth), and the president-elect is Sir Robert Christison. The B. A. embraces at present seven sections, thus named—Section A, Mathematics and Physical Science; B, Chemistry; C, Geology; D, Zoology and Botany, including Physiology; E, Geography and Ethnology; F, Economic Science and Statistics; G, Mechanical Science and Engineering. The *Proceedings* (1831-75) form a valuable scientific library.

British Gum, or Dextrine, is obtained either by heating starch by itself to a temperature of 150° , or by maintaining a mixture of 1 part of starch, 3 of water and $\frac{1}{2}$ of oil of vitriol for some time at a temperature of 90° C. Dextrine is a solid amorphous substance, soluble in water in all proportions. Its solution in water is mucilaginous, and is much used as a substitute for gum arabic, especially by the calico-printer, as a vehicle for colours. Its chemical composition is identical with that of starch, both having the formula $C_6H_{10}O_5$; it differs from starch in colouring dilute solutions of iodine red, whereas starch colours them blue. Diastase (q. v.), or dilute sulphuric acid, causes it to take up water to form *glucose*, or grape-sugar.



Dextrine. Water. Glucose.

British Museum, a national collection of the greatest value, situated in London. It dates its origin from a bequest by Sir Hans Sloane in 1753. Sir Hans directed that his library, consisting of 50,000 volumes, and his valuable collection of antiquities and works of art, should be handed over to the Government on condition of £20,000 being paid to his family. By means of a lottery the sum of £94,194 was raised, and the required £20,000 was thereupon paid for the Sloane collection. This, with the Hamilton collection of Roman antiquities, and the Cottonian and Harleian collections of MSS., was placed in Montague House, the Duke of Montague's town residence, which was bought for the purpose. Thenceforth the new institution bore the name of 'The B. M.' It was opened to the public for the first time on 15th January 1759. Large and valuable additions being rapidly made to the contents of the museum, the accommodation afforded by Montague House soon became quite insufficient. At length, on the library formed by George III. being presented to the nation by George IV. in 1823, it was resolved to erect a new building. The plans were prepared by Sir R. Smirke, and the eastern side of the present edifice was completed in 1828. By 1845 Montague House had disappeared, and the new building been erected in its stead. Further additions have been made to the building at various times, the most important being the new reading-room and adjoining libraries. The reading-room was erected in the three years 1855-57, at a cost of about £150,000. Iron has been principally employed in its construction, the main ribs resting upon brick arches. The dome is 106 feet in height, and 140 feet in diameter. The quantity of glass used is about 60,000 square feet. Great pains have been taken to ensure proper ventilation. The building comprising the reading-room and library, is situated in the inner quadrangle, and in order to lessen the danger from fire, the building is separated from the rest of the museum by a clear space of 28 feet. This inner building occupies an area of 48,000 square feet. The exterior edifice belongs to the Ionic style of architecture. It is in the form of a square, the southern face, towards Great Russell Street, being the principal one. It consists of a columnar façade 370 feet long, with a grand entrance portico at the centre. Including the houses of the chief officers, situated one at each end of the front of the building, the entire face of the museum is 570 feet in length.

The museum is under the management of forty-eight trustees, the chief of whom are the Archbishop of Canterbury, the Lord Chancellor, and the Speaker of the House of Commons. During 1875 the staff of the museum consisted of 23 principal officers, 87 assistants, 145 attendants and servants, and 67 artisans, &c.—in all, 322 persons. The total sum voted for the maintenance of the establishment and all other expenses during the financial year 1875-76 was £107,451. The museum is open free to the public every Monday, Wednesday, and Friday, as well as every Saturday during the summer months. During 1874 the museum was visited by 601,843 persons, including those by whom the reading-room was used.

The contents of the B. M. were originally divided into three departments—viz., Printed Books, MSS., and Natural History. At the present time there are, in addition to these, eight other departments—viz., Oriental Antiquities, British and Mediæval Antiquities and Ethnography, Greek and Roman Antiquities, Coins and Medals, Botany, Prints and Drawings, Palæontology and Mineralogy. Each of these departments is under the immediate charge of an 'under-librarian,' the head officer of the entire establishment being styled the 'principal librarian.' A

brief notice of the contents of the several departments is subjoined:—

1. *Printed Books*.—These form the largest department in the museum. The Sloane collection, and a much smaller one bequeathed to the nation in 1738 by Major Edwards, formed the nucleus. In 1757 George II. gave to the museum the library collected by the Kings of England from Henry VII. downwards, the gift including the libraries of Cranmer and Casaubon. With the gift of the royal library, the same sovereign conveyed to the museum the right to a copy of every publication entered at Stationers' Hall. A number of private donors, chief among whom were Dr Bentley and Sir Joseph Banks, swelled the contents of the library. In 1823 came the gift of George IV. already mentioned. Its value was nearly £200,000, and by the terms of the gift it is kept separate from the other books, being known as the King's Library. In 1846 the Right Hon. Thomas Grenville bequeathed to the museum his own library, containing more than 20,000 volumes. At the present time (1875) the entire library of the B. M. consists of about 800,000 volumes, besides a much larger number of parts of volumes. During 1874 there were added to it 37,000 volumes, of which 28,000 were purchased. These figures include music and newspapers. More than 40,000 parts of volumes were also added during the same period. The average daily number of readers in the reading-room in 1874 was 358. More than 29,000 volumes from the general library were consulted, besides 825,000 taken by students from the shelves of the reference library. Permission to use the reading-room is now easily obtained, but originally the *entrée* was confined to a privileged few. In July 1759 the reading-room was attended by only five readers. Accommodation is now provided for 300 readers, each of whom is allotted a space four feet three inches long. The B. M. library contains upwards of twenty-five miles of shelves, on which are to be found the rarest and most precious books, among them being copies of the first edition of almost every famous English work extant. Of some books there are copies of many editions—e.g., of the *Pilgrim's Progress*, seventy-five in English, and twenty-nine in other languages; of the *Paradise Lost*, seventy-two in English, and fifty-two in other languages; and of *Robinson Crusoe*, one hundred, of which seventy-four are in English. The catalogues form quite a library in themselves, as may be conceived from the fact that the heading 'William Shakespeare' alone fills two folio volumes.

2. *Manuscripts*.—These are principally bound in volumes, and comprise many priceless treasures. The collection has been added to at different times by various donors. Among its contents may be enumerated the original *Magna Charta*, a mortgage-deed signed by Shakespeare, Milton's contract for the disposal of the *Paradise Lost*, and the original MSS. of many famous English works; many precious documents of much greater antiquity, such as the *Codex Alexandrinus* (a transcript of the Bible in uncial Greek, dating from the 5th c.), and the earliest copies of the *Iliad* and *Odyssey*; likewise autographs of celebrities of many ages and nations.

3. *Oriental Antiquities*.—In this department are included Egyptian and Assyrian antiquities. The former comprise sculptures of all kinds and sizes inscribed with Hieroglyphics (q. v.), idols, articles of dress and furniture, mummies, &c. One of the most interesting and valuable of the objects exhibited is the celebrated Rosetta Stone (q. v.). The Assyrian antiquities include the sculptures brought from Nimrud, Khorsabad, and Kouyunjik by Layard and others, many of them being covered with pictorial representations of historical events, and inscribed with cuneiform characters. In 1873-74 valuable additions were made to this collection in the shape of a large number of burnt clay tablets, excavated at Kouyunjik by Mr George Smith. These tablets have been in part deciphered by Mr Smith, who has found them to contain Chaldean legends of the creation, fall, deluge, building of the Tower of Babel, &c. The tablets were presented to the museum by the proprietors of the *Daily Telegraph*, at whose expense Mr Smith's labours in Assyria were conducted.

4. *British and Mediæval Antiquities and Ethnography*.—In this department are to be found antiquities anterior to the Roman occupation of Britain, antiquities of the Roman period, Anglo-Saxon antiquities, and sculptures, carvings, metal-work, enamel, glass, pottery, &c., of different European nations down to the 17th c. There is also a small collection of antiquities found in the catacombs of Rome, and relating to the early Christians.

The ethnographical collection includes both the antiquities and the objects in modern use belonging to all nations not of European race.

5. *Greek and Roman Antiquities*.—The most famous of the Grecian antiquities contained in this collection are—the Lycian Gallery, consisting of a number of bas-reliefs, friezes, &c., brought from the ancient cities of Lycia in Asia Minor in 1842–46 by a British Government expedition under the direction of Sir C. Fellows; the Elgin Marbles (q. v.), collected by the seventh Earl of Elgin in 1801–3, and purchased from him in 1816 by the nation for £35,000; and the Hellenic marbles, obtained in various parts of Greece (exclusive of Attica) and its colonies. The most valuable of the last is a collection known as the Phigalian Marbles, discovered in 1812 amongst the ruins of the temple of Apollo Epicurius, near the ancient city of Phigalia, in Arcadia. In 1874 there were added a number of valuable inscriptions excavated by Mr Wood on the site of the Temple of Diana at Ephesus. Of the Roman collection, one of the leading features is the gallery containing the Townley Marbles, purchased for £20,000 in 1805, after the death of Mr Charles Townley, by whom they were collected. They consist of a number of statues and busts. The other Roman antiquities consist principally of vases, called Etruscan, bronze ornaments and weapons, lamps, urns, &c., as well as architectural fragments.

6. *Coins and Medals*.—In this department is arranged an immense number of coins, &c., of every age, the Roman and Anglo-Saxon collections being the most noteworthy. The arrangement of the department is most excellent.

7. *Botany*.—To the bequest of Sir H. Sloane, consisting of about 8000 species, many valuable additions were made in succeeding years, both by bequest and by purchase. Chief among the bequests was that of the splendid herbarium of Sir Joseph Banks in 1820; and among the purchases may be mentioned that of Professor Nuttall's collection in 1860. There is also on view a large collection of woods and other vegetable structures not suited to a herbarium.

8. *Prints and Drawings*.—Up to 1840 the collections of this department consisted entirely of bequests, but since that date extensive purchases have been made, and there are now to be seen here drawings and engravings illustrative of all the schools of European art.

9. *Paleontology*.—This department contains a valuable and interesting collection of fossil animals and plants, obtained in all parts of the globe.

10. *Mineralogy*.—The collections of this department occupy four rooms, and among their most interesting features may be mentioned the meteorites, including one weighing 3½ tons, found at Cranbourne, Australia.

11. *Natural History*.—This department received by gift, made during 1874, Mrs J. E. Craig's collection of shells, comprising 12,000 specimens, representing 4000 species. In the same year there was purchased for its use Mr Edward Saunders's collection of beetles, numbering 7267 specimens. The zoological collections at present occupy three galleries, but as this space is quite inadequate to their requirements, a new building, intended specially for their accommodation, is in course of erection adjoining the South Kensington Museum. The total cost of this new building will be £395,000, and it will probably be completed in 1877. See Edwards' *Lives of the Founders of the B. M.* (2 vols. Lond. 1870), and Nichols' *Handy-book of the B. M. for Everyday Readers* (2d ed. Lond. 1870).

British Navy, the material and personnel of the war-fleet of Great Britain. A naval force in time of peace was first maintained in this country by King Henry VII., who built the *Great Harry*, a three-masted ship, carrying 80 guns, the first line-of-battle ship of the B. N. Henry VIII. matured very considerably his father's plans for the establishment of a permanent fleet of ships of war. Among others, he caused to be built the *Regent*, the *Marie Rose*, and the celebrated *Henri Grâce de Dieu*, 72 guns, 700 men, and 1000 tons burden. At the end of his reign, in 1547, there was a navy comprising 71 vessels of all sorts, and measuring 11,268 tons. The naval force of England was considerably diminished during the reign of Edward VI. and Mary; but the exigencies of the long reign of Elizabeth caused it to revive greatly; and at her death, in 1603, the fleet counted 42 ships, measuring 17,055 tons, and 8346 seamen. Phineas Pett,

the ablest naval architect England had produced, lived during the reign of James I., and the art of shipbuilding was indebted to him for many improvements. At the death of James, in 1625, the B. N. consisted of 33 ships, their tonnage measuring 19,400. Charles I. divided the navy into rates and classes. At the beginning of his reign he caused several new ships to be built,—among others, the *Sovereign of the Seas*, 100 guns, 1637 tons, the largest ship that had ever been built in England. But it was under Cromwell that the ratings were clearly defined, and that regular system was established which remains in force to the present time. At the Protector's death, in 1658, the ships in the navy numbered 157; their tonnage, 21,910; and they carried 50,000 men. A new era in the B. N. began at the Restoration of Charles II., in 1660. Under the energetic administration of the Lord High Admiral, the Duke of York, the royal fleet became a fine armament. Notwithstanding the decay into which it had been allowed to fall during a portion of his reign, at the death of Charles, in 1686, the navy amounted to 179 ships, of 103,558 tons. During this reign great advance was made in mechanical science, and it was at once applied to naval architecture. When the Duke of York mounted the throne, as James II., he continued to evince a warm interest in the B. N. At his abdication, in 1688, it was a force of 173 vessels, of 101,892 tons, 6930 guns, and 42,003 men. Under William and Mary, 99 new ships were added to the fleet; and it was the celebrated engagement off Cape la Hogue, in 1692, which gave the B. N. its ascendancy over that of France. At her accession, Queen Anne came into possession of a navy consisting of 272 vessels, of 159,020 tons; and during her reign many measures adding to the strength and efficiency of the fleet were adopted. At her death, in 1714, there were 198 ships, 10,600 guns, 167,119 tons,—fewer vessels than at the beginning of her reign, but a tonnage larger by 8199. New dimensions for several classes of ships were established during the reign of George I., at whose death, in 1727, the navy consisted of 203 ships, of 170,862 tonnage. The wars during the reign of George II., and the signal successes achieved by the B. N., led to considerable augmentation of it. A scale of increased dimensions was established; and when that monarch died, in 1760, there were 412 ships, measuring 321,104 tons, the vote for the naval service of that year being £5,611,508, 51,645 sailors, and 18,355 marines. The progress of the navy during the long reign of George III. was unprecedented. The struggle with America and revolutionary France led to an immense increase of the B. N., the result being its undisputed sovereignty of the seas. From the commencement of hostilities with France in 1793 to the peace of 1815, the British took from their enemies 155 line-of-battle ships, and 586 smaller war-vessels; while their enemies took from them 5 of the former, and 151 of the latter class of war-ships.

Since 1815 the B. N. has been reconstructed by the building of larger ships, the introduction of steam power, and the adoption of armour-plated vessels. Many of these iron-clad ships revive an ancient mode of warfare by being used as 'rams'; the metal prows and screw propellers, however, are something infinitely more destructive than the beaked galleys of the ancients. (See RAM.) The most recent feature of naval reconstruction has been a decrease in the number of guns simultaneously with an enormous increase of their power and range. A heavy armour-plated war-sloop of the present day, it has been estimated, would be more than a match for a fleet of the class of first-rates known to Nelson. In the iron-clad fleet the heaviest guns and armour are carried by Turret Ships (q. v.).

The number of seamen and marines provided for the naval service of Great Britain in the estimates for 1873–74 was as follows:—Seamen, 34,000; boys, including 3000 for training, 7500; marines afloat, 8000; on shore, 6000—total, 55,000. For the coastguard, the officers and men on shore numbered in the estimates 4300; and 1200 were reckoned for Indian service. Adding these to the total given above, 61,000 officers and men were the personnel of the B. N. in 1874. In the same year the fleet consisted of 57 armour-plated vessels, about 300 steam and 170 sailing vessels—total, 527. The expenditure on the navy for the year ending March 31, 1874, was estimated at £9,872,725. As in the army, the naval force of the United Kingdom is recruited by voluntary enlistment. The men are divided into two classes, those who engage for ten years' continuous service, and those who volunteer for shorter periods, the former being paid at a higher rate.

The government of the navy is vested in the Board of Admiralty. It consists of five members:—The First Lord, who has supreme authority, all questions of importance being left to his decision; the Senior Naval Lord, who directs the movements of the fleet, and is responsible for its discipline; the Third Lord, who has the management of the dockyards, and superintends the building of ships; the Junior Naval Lord, who has to do with the victualling of the fleets and the transport department; and the Civil Lord, who is answerable for the accounts.

British Wine. See GINGER-WINE.

Britt'any. See BRETAGNE.

Brittlestar, a genus of starfishes (*Echinodermata*) included in the order *Ophiuroidea* of that class. They are distinguished from common starfishes by the fact that the viscera or organs of the body are confined to the central disc or body, and do not extend into the rays; whilst the ambulacral or 'walking' system of tube feet is rudimentary, and not adapted for locomotion. The brittlestars form the genus *Ophiocoma*, and the familiar species are the common B. (*O. rosula*), *O. neglecta* (the 'grey B.'), *O. punctata*, and *O. filiformis*. They derive their popular name from their curious habit of breaking off their rays when irritated or touched; and, from this peculiarity, it is a rare occurrence to secure a perfect specimen. The arms are five in number, and of simple form.

Brittlewort. See DIATOMACEÆ.

Britt'on, John, a topographical and antiquarian writer, born 7th July 1771, at Kingston-St-Michael, Wiltshire. Deprived of sufficient education by the death of his parents, he led a precarious life until he was engaged by the editor of the *Sporting Magazine* to prepare the *Beauties of Wiltshire*. After writing descriptions of other counties, B. devoted himself to producing magnificent illustrated works on old buildings in England and the Continent. His *chef-d'œuvre* is *The Cathedral Antiquities of England* (14 vols. 1814-35), with more than 300 plates. In all, B. produced nearly ninety works. He died 1st January 1857.

Brive-la-Gaillarde, a town in the department of Corrèze, France, on the left bank of the Corrèze, and on the railway between Bordeaux and Lyon, 15 miles S.W. from Sulle. It has a fine collegiate church, St Martin, of the 13th c., and is sometimes called the capital of the Bas-Limousin, at the S. base of which it lies, in a region fertile in fruits, wheat, maize, and wine. B. has an active export trade in millstones and slates. Pop. (1872) 8016.

Brixham, Upper and Lower, a market-town and seaport of Devonshire, England, on Tor Bay, 5 miles S. of Torquay. The Dartmouth and Torquay branch of the S. Devon Railway has a station at Brixham Road, two miles from the town. Its prosperity depends chiefly on its fisheries. Upwards of 200 vessels are engaged in trawling, and large quantities of turbot, sole, mackerel, and other fish are exported to London, Bristol, Exeter, &c. B. has also, however, a number of vessels engaged in coasting and foreign (chiefly Mediterranean) trade. Pop. (1871) 4941. B. is historically interesting as the landing-place of William of Orange, November 4, 1688.

Brisure', Brisé, Brisé, in heraldry, a difference or mark of cadency, indicating that a charge is broken.

Broach, or **Broche**, in architecture, is a term applied to a spire which springs direct from the tower without any intermediate parapet.

Broach. See BAROACH.

Broad Arrow (→) is the Government mark or stamp cut into or affixed to all solid material in dockyards and elsewhere belonging to the crown. The origin of the mark is not known. Any one in possession of goods so marked is liable in heavy penalties.

Broad-Bill. See SHOVELLER.

Broad'side, in a sea-fight, is the discharge at the same instant of all the guns along one side of a ship of war; and by the weight of shot and shell capable of being fired at one time the fighting power of a ship is sometimes estimated.

Broad'sword, a sword with a broad blade. Being used for cutting only, it has no sharp point for stabbing, like the sabre, and is very little used in the British army.

Brocade', a tissue of silk on which a damask figured pattern is woven. Brocades are chiefly used as an upholstery cloth for furniture and hangings.

Brooage. See BROKER.

Brooage Bonds are, in England, bonds by which a reward is stipulated for on account of the promotion of a particular marriage, by means of influence to be exerted over one of the parties. They are legally void, as being contrary to the freedom of marriage.

Brocc'oli, a garden variety of the common cabbage (*B. oleracea*), said originally to have been brought to Italy or other parts of Europe from the island of Cyprus in the 16th c. It is a variety of the Cauliflower (q. v.), differing from it in having coloured instead of white heads, and in having a deeper tinge of colour in the leaves. It is also cultivated in much the same way as the cauliflower. There are various varieties, the most esteemed of which, especially for late sowing and spring use, are the Cape broccolis.

Brochure' (Fr. *brocher*, to stitch), a word imported from the French, strictly denotes a small printed work, not *bound*, but only *stitched* together; but in England, at least, it is applied loosely to any publication bearing on a question of the day, whether bound or not.

Brock'en (Lat. *Mons Melibrocus*), the loftiest peak in the Hartz Mountains, situated in Stolberk-Wernigerode, Prussian Saxony, is popularly known as the Blocksberg (q. v.), and is a centre of German legend and fairy-tale. It is 3740 feet high, consists chiefly of granite, and has a wild, barren summit, from which in clear weather there is a splendid prospect. The well-known phenomenon of the *Brockengespenst*, or spectre of the B., is caused by the level light of sunrise or sunset throwing the shadow of intervening objects on the dense mist by which the peak is frequently veiled. At the base of the dome-like summit, and 3250 feet high, lies the *Brockensfeld*, an extensive morass, in which the rivers Bode, Ocker, Raday, and Oder take their rise.

Bro'haus, Friedrich Arnold, a great German publisher, born at Dortmund, formerly a free imperial town, now in the Prussian province of Westphalia, 4th May 1772. In 1808 he purchased the copyright of the *Conversations-Lexicon*, of which the first edition was completed in 1810, and the second in 1812. These were published at Altenburg. In 1817 he transferred his business to Leipzig where he was very prosperous. B. died 20th August 1823. He was an enlightened, patriotic and lovable man. The publishing business was carried on at first by his sons, **Friedrich B.**, born 23d September 1800, at Dortmund, and **Heinrich B.**, born 4th February 1804, at Amsterdam, along with Karl Ferdinand Bochimann (died 12th February 1852); but on the 1st of January 1850 Heinrich B. undertook the sole management and responsibility. He is assisted by his two sons, **Heinrich Eduard B.**, born 7th August 1829, and **Heinrich Rudolf B.**, born 16th July 1838, and has not only sustained, but even extended, the reputation of the firm. To him we owe the 10th and 11th editions of the *Conversations-Lexicon*, the former of which appeared in 1853-55, and the latter in 1864-68, with two supplementary volumes in 1872-73. **Hermann B.**, third son of Friedrich Arnold B., was born at Amsterdam, 28th January 1806, appointed Professor of Sanskrit at Leipzig (1841), and died there January 5, 1877. He wrote and edited many valuable works, and from 1856 was the editor of that colossal work, still unfinished, the *Allgemeine Encyclopädie* of Ersch and Gruber.

Brook'ville, a flourishing town in the Dominion of Canada, province of Ontario, and a station on the Grand Trunk Railway, lies on the left bank of the St Lawrence, 65 miles S. of Ottawa. It has extensive hardware manufactures. Pop. about 6500. All the steamers plying between Montreal, Kingston, Toronto, and Hamilton stop at B., and a steamer leaves daily for Chicago and intermediate ports.

Bro'die, Sir Benjamin Collins, a distinguished surgeon, was born June 9, 1783, at Winterslow, near Salisbury, Wiltshire, studied under Sir Everard Home at St George's Hospital,

where he subsequently became surgeon, was created a baronet in 1834, and appointed serjeant-surgeon to the Queen, and died 21st October 1862. B. is the author of *Lectures on Local Nervous Affections* (1837), *Lectures Illustrative of Subjects in Pathology and Surgery* (1840), *Psychological Inquiries as to Mental Faculties* (1854), and several other works. See *Autobiography of Sir B. B.* (Lond. 1865). His son, Sir B. O. B., born in 1817, was appointed Professor of Chemistry at Oxford in 1855, and has contributed several scientific papers to the *Philosophical Transactions*, and to the *Journal of the Chemical Society*.

Brodie, William, born at Banff, 22d January 1815, commenced modelling in Aberdeen in 1840, went to Edinburgh in 1846, and studied at the art schools there. He exhibited first in 1847, was elected Associate in 1852, and Academician in 1859. In his statues, busts, and imaginative subjects he has shown fine fancy and delicacy of treatment. Among his ideal statues are 'Corinna,' in the possession of Mrs Baird of Stitchell; 'Cenone,' belonging to Lady Ashburton; 'Hecamede,' executed for Lord Taunton; 'Summer and Winter,' for J. Young, Esq. of Kelly, &c. Among his public statues are those of the late Prince Consort at Perth, Sir David Brewster and Sir James Y. Simpson at Edinburgh, the late Master of the Mint (Dr Graham) at Glasgow, &c.; while among his busts and portrait-statues are those of Her Majesty the Queen, Lady Kinnaid, Lord Barcaple, Sir Robert Christison, Dr Guthrie, and Principal Candlish.

Bro'dy, formerly *Lubnitz*, a thriving free town of E. Galicia, Austria, near the Russian frontier, with manufactures of leather and linen, and a large trade in the products of Poland, Russia, and Turkey. It is guarded by a castle. Pop. (1869) 18,743, of whom two-thirds are Jews.

Brog, Brogue, a rude kind of shoe formerly worn by the Celts of Ireland and Scotland. The term B. is also applied to the Irish pronunciation of the English language.

Brogliè, an ancient French family, originally from Quiers in Piedmont. It has produced many distinguished men, among whom may be reckoned several archbishops, bishops, governors, and three marshals of France. It was composed of four branches.—**Albéric de Broglio**, a famous captain of his time, after having captured the city of Assisi, left Turin, and fixed himself at Rimini, where he founded the first branch.—**Simon de Broglio** (dead before 1394) is the father of the three other branches, of which the first established itself in Provence, the second in Paris, and the third in Piedmont. To the last belongs the present Duc de B., though his family has been settled in France for some centuries.—**Albert, Duc de B.**, son of Achille Léonce Victor Charles, Duc de B., a politician of note in the reign of Louis Philippe, and grandson of Claude Victor, Prince de B., who was guillotined in 1794, was born at Paris, 13th June 1821, and at an early age made a name for himself as a political writer. He commenced as a contributor to the *Revue des Deux Mondes*, and was afterwards one of the chief writers in the *Correspondant*. Equally opposed to the one-sided doctrines of mediæval papistry and modern rationalism, autocracy, and democracy, he has been an able defender of Catholic interests and of moderate constitutional liberalism. His principal literary work is *L'Église et l'Empire Romain au 4me Siècle* (2 vols. Par. 1856). Two other works may be regarded as continuations of it, *Julien l'Apostate* and *Theodore le Grand*. He became the head of the family on the death of his father, January 25, 1870, and a political career was opened to him by the fall of Napoleon III. In 1872 he was appointed by M. Thiers French ambassador to London during the negotiations on the treaty of commerce, a post which he held only for two months. His latest work is *Le Secret du Roi: Correspondance Secrète de Louis XV. avec ses Agents Diplomatiques* (Par. 1878).

Broiling, a kind of rapid roasting process employed in the cooking of meat and the smaller white and cured fish. The process is conducted on a gridiron, called in Scotland a *brander*, hence the process in that country is generally known as 'brandering.' B. should be done over or in front of a bright, glowing fire of smokeless embers, and hence a coke fire is most suitable for the process. Meat cannot be broiled in large masses, and it is only rump steaks and chops, white or yellow haddocks, or whittings, and similar fish, that are generally prepared by the

process. The meat should be brought quite close to the fire, by which it is rapidly scorched on the surface, and frequently turned, either by turning the apparatus or with a small pair of tongs; but it should not be pierced with any instrument, as thereby the nutritive juices would be allowed to escape. In a very few minutes the meat is sufficiently cooked, and the process is thus a rapid means of procuring a savoury and nutritious meal.

Broken Knees (in horses), an injury or abrasion of the 'knee'—which, however, in reality is the horse's *carpus* or wrist—resulting generally from a fall or severe bruise. The injury naturally varies much in its character and in the effects which it leaves, as exhibited in the form of cicatrices or unsightly scars. The 'broken-kneed' or 'scarred' horse has thus a greatly depreciated value. The causes of this accident are due to whatever impairs the sure footing of the horse—such as imperfect shoeing, stumbling on stones, &c. The treatment of this accident partakes of that adapted for ordinary contusions. Great attention should be paid to the thorough cleansing of the wound from particles of dirt, stones, &c. The wound is then to be washed with cold water, and to be bandaged with cold-water cloths, frequently renewed. If the joint has been opened into—the worst form of this injury—and a feverish condition ensues, a free purge, mashes, and low diet should be given, as in antiphlogistic treatment generally; whilst the wound should be poulticed to thoroughly clean it, if foreign bodies are still contained within the deep wound. During the later stages, and when the wound is healing, mild, stimulating, or astringent washes of zinc or copper sulphate, or of acetate of lead, should be used. The hair may sometimes be induced to grow on a cicatrix by using mild cantharidine ointment. B. K. constitute merely a *blemish*, and are not in law regarded as evidence of *unsoundness*.

Broken Wind (in horses), the name given to a functional affection of the breathing organs in horses, which seems to consist in a difficulty in respiration, probably depending upon some spasmodic affection of the larynx or bronchi. By some authors the affection is regarded as consisting chiefly in palpitation of the heart, whilst others refer it to a form of asthma with other respiratory complications. The *symptomatology* of the complaint is of obvious kind; the horse is generally thin, the abdominal muscles are relaxed, the respiration is quick, heavy, and laboured, and the muscular movements are irregular and spasmodic in their nature; cough is generally present, the pulse is rapid; the heart's action quick and enfeebled; and the entire aspect of the animal indicates a condition of prostration and weakness. The causes of the disorder are attributed to bad feeding and injudicious dietary. Coarse food given at improper times, by loading the stomach, and impeding digestion, together with inattention to watering, are said to be the chief causes. Low-bred horses are more subject to B. W. than high-bred ones. The treatment is limited to *free purgation, careful attention to diet, and rest*. Good oats, bruised, and in quantities of from 8 lbs. to 12 lbs. daily, with hay, form the curative dietary. Narcotics and sedatives (opium, camphor, &c.) do little or no good; and the modern treatment is therefore, at the best, only *palliative*. If left unheeded, congestion of the lungs, or even suffocation, may result. This disease constitutes legal *unsoundness* in the horse, and it is frequently temporarily and fraudulently disguised by giving the horse *shot or lead* in its meals preparatory to its being sold—the weight in the stomach, curiously enough, having an effect in temporarily mitigating the symptoms.

Broker is an agent who buys and sells shares and goods for others, being paid by commission, that is, a percentage on the value of the transaction. There are various kinds of brokers. 1. Those who act as agents for the sale of commodities or of stock in the public funds. 2. Shipbrokers (q. v.). 3. Insurance brokers, who negotiate between the merchant and freighter and the underwriter in settling for loss or damage. (See, under INSURANCE, *Maritime Insurance*.) 4. Sharebrokers, who transact business and effect transfers in shares in general. The laws, regulations, and mode of transacting business of this body are of much importance to the public. (See EXCHANGE, STOCK.) 5. Bill Brokers (q. v.). 6. Persons who appraise goods, sell or distrain furniture for rent, are called brokers, though their occupation is totally different from that of any of the former classes. The Fraudulent Trustees' Act, 20 and 21 Vict., c. 54, applies to brokers.

It inflicts penalties on those who appropriate funds intrusted to them.

Brokerage is the remuneration allowed to a Broker (q. v.). To stock and share brokers the usual allowance on our stock exchanges is at the rate of about 10s. per £100 on the value bought or sold. A shipbroker's charges are generally about 2 per cent. upon the gross receipts. An insurance broker charges 5 per cent. on the premium and $\frac{1}{2}$ per cent. deducted from claims recovered from the underwriters. See STOCK AND SHARE BROKER, SHIPBROKER, and INSURANCE BROKER.

Bromberg (Pol. *Bydgoszcz*, whence the Lat. *Bidgostia*), a town of Prussia, province of Posen, on the Brahe, 6 miles above its junction with the Vistula, and 60 miles N. E. of the city of Posen. It is a station on the Eastern Prussian Railway, and is also connected by rail with Warsaw. The *B. Canal* connects the Brahe and Netz. B. has manufactures of linen, woollens, tobacco, Prussian blue, &c.; also distilleries, breweries, corn-mills. In the 14th c. it was a very flourishing place, and after a period of decline is again rapidly rising. By the *Treaty of B.*, 16th November 1676, Poland surrendered the sovereignty of Plessen to Brandenburg. Pop. (1871) 27,734.

Brome's grass (*Bromus*), a genus of grasses allied to the Fescue (q. v.). There are many species, of which seven are natives of Britain. The soft brome (*B. mollis*) grows wild, and is eaten by cattle, but is little esteemed by farmers as a pasture-grass. Its seeds, as well as those of *B. purga* and *B. catharticus* (the first a native of N. America and the latter of Chili), are said to be deleterious, and the two latter emetic and purgative. *B. mollis* is a good grass for poor soil; and the same may be said of the smooth *B. (B. racemosus)*, which, as well as *B. mollis*, is said to be a variety of *B. arvensis* (the field brome). The tall brome (*B. giganteus*) grows to the height of four or five feet, but is not much relished by cattle. Rye-like field brome (*B. secalinus*, perhaps also a variety, according to Bentham, of *B. arvensis*) is a troublesome weed, especially in rye-fields. Its seeds are erroneously said to be poisonous. Poultry are very fond of them.

Bromeliaceæ, a natural order of Monocotyledonous plants, mostly found in the tropics of America, W. Africa, and the E. Indies, though they appear to have been naturalised in many of the countries where they are now found from W. Africa and the E. Indies. There are about 180 species, and the order is important on account of the edible fruits and the useful fibrous material obtained from some of the species. *Ananassa sativa* is the Pine-Apple (q. v.). *Bilbergia tinctoria* of Brazil yields a yellow colouring agent from its roots. *Bromelia Pingium* is a vermifuge, and its leaves yield a good fibre. The juice of its fruits affords a cooling drink, given in the W. Indies, when mixed with water, to patients in fever and dysentery. *Tillandsia usneoides* is the Tree Beard or Old Man's Beard, so called from its dark fibres hanging from some of the S. American trees, like the *Usnea* and other northern lichens. It is imported under the name of Spanish or New Orleans moss, and is used, when mixed with horse-hair, for stuffing cushions, &c.

Bromine is the only element, except mercury or quicksilver, liquid at ordinary temperature. It was discovered by Balard (1826) in the mother liquors or *Bilturn* (q. v.) of the salt-springs of Montpellier. Combined with sodium or magnesium, B. occurs in small quantities in sea-water, in certain mineral springs—especially in those of Theodershall, near Kreuznach, in Prussia—in some specimens of Chile saltpetre, and along with iodides in *Kelp* (q. v.). *Bromide of silver* is occasionally found as a rare mineral in Mexico. B. is prepared either from *kelp* or from the bitter of the salt-springs. From either of these materials the chlorides and sulphates are got rid of as far as possible by fractional crystallisation, and the remaining liquor is distilled with a mixture of hydrochloric acid and biniodide of manganese, when B. accompanied by water passes over. In this process chlorine is produced by the action of the hydrochloric acid on the biniodide of manganese—



Biniodide of man- ganese.	Hydro- chloric acid.	Chloride of man- ganese.	Water.	Chlo- rine.
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and the chlorine thus produced displaces the B. contained in the metallic bromide—



Bromide of mag- nesium.	Chlo- rine.	Chloride of mag- nesium.	Brom- ine.
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B. is a heavy red liquid (sp. gr. 2.9), having a peculiar and disagreeable odour, whence its name (*brōmos*, Gr. 'stink'). It readily volatilises, even at ordinary temperatures, as a deep red gas. It boils at 58° C., and solidifies to a grey metallic-looking mass at 22° C. B. combines with all the elements, and has a special affinity for hydrogen; it chars organised substances, and is an irritating and corrosive poison. Its most important compound is *bromide of potassium*, which is largely used in medicine as a sedative. The atomic weight of B. is 80, and its chemical symbol is Br.

Bromsebro, a village of Sweden, in the län of Calmar, 29 miles S.W. of Calmar, possesses a historical interest as the place where treaties were drawn up between Sweden and Denmark in 1541, 1641, and 1645.

Bromsgrove (earlier, *Bremesgrave*), a once prosperous but now declining market-town of Worcestershire, England, 11 miles N.E. of Worcester, in a beautiful valley near the Birmingham and Worcester Canal, and 1½ miles from a station on the Birmingham and Bristol Railway. The chief industry is the manufacture of nails, needles, and buttons. Pop. (1871) 6967.

Bronchi are a continuation of the Trachea (q. v.), and are formed by the trachea or windpipe dividing into two—the right and left B.—one going to each lung. The right B. is the wider and shorter, being only one inch in length, whereas the left B. is two inches in length. The B. in structure resemble the trachea, being composed of rings of cartilage somewhat imperfect behind, bound together by fibrous tissue. The number of rings in the right B. is from six to eight, and in the left B. from nine to twelve. On entering the lung, the B. divide and re-divide, becoming smaller and smaller, until they ramify throughout the whole lung substance, and end in dilated sacs called the air cells of the lungs. (See LUNGS.) Through the B. the air is transmitted into all parts of the lung, and brought into close contact with the blood. See RESPIRATION.

Bronchitis, or inflammation of the lining membranes of the bronchial tubes, may be acute or chronic, may affect one or both lungs, the whole or only portion of a lung. It affects most frequently the upper lobes of the lung. *Acute B.* is a dangerous disease, the inflammation often extending to the lung tissue. The symptoms are fever, tightness about the chest, rapid breathing, wheezing, and cough. On coughing, a glairy mucus is expectorated, and afterwards the expectoration consists of purulent matter. The pulse is quick, the tongue foul, and often there is much constitutional disturbance. When B. is confined to the larger bronchi, the disease is not generally dangerous, but when it extends to the small air tubes (*capillary B.*), the disease is very serious and often fatal. *Capillary B.* is common in children, rare in middle life, and not unfrequent in the aged. B. is common in this country, and in all damp, cold climates. *Treatment*—confinement to bed in a warm room; steam is to be inhaled. Beef-tea, milk, and mucilaginous drinks are beneficial. At the outset an active purge often does good. Mustard to the chest, and some medicine which will produce free sweating, are often very valuable. Sometimes rubbing the chest with a liniment of croton oil or tartar emetic ointment will afford relief. Of internal medicines, ammonia, chloroform, squills, and senega are the best. *Chronic B.* is common in advanced life. Constant cough, shortness of breath, and abundant expectoration of mucus, not unfrequently very fetid, may be regarded as the chief symptoms. *Treatment*—chloroform, ammonia, senega, ipecacuan, squills, or turpentine in small doses. Cod-liver oil, stimulants, as wine and brandy, and good nourishing food, will often benefit the patient.

Bronchocele. See GOITRE.

Bründsted, Peter Oluf, a Danish antiquary and philologist, was born 17th November 1780, at Horsens, Jütland. He studied at Copenhagen, went in 1806 to Paris, and afterwards travelled in Italy and Greece. His excavations in Greece, executed in company with Haller von Hallerstein, Linckh, and Von Stackelberg, did much to illustrate classical antiquity, and an account

of his researches was published at Paris in 2 vols. 4to (1826-30), simultaneously in Danish and French. B. was appointed Professor of Greek at Copenhagen in 1815, and subsequently was appointed rector of the University, and died 26th June 1842, in consequence of a fall from his horse. His professorial lectures were published after his death (2 vols. Copenh. 1844).

Brongniart, Alexandre, a distinguished French mineralogist and geologist and naturalist, was born at Paris, 5th February 1770, and was appointed in 1800 director of the porcelain manufactory at Sèvres, which post he occupied till his death, which took place October 4, 1847. B. held other appointments. In 1818 he was appointed Chief Engineer of Mines, and in 1822 Professor of Mineralogy at the Natural History Museum of Paris. He and Cuvier worked together in some departments, and the result of their labours was B.'s *Essai sur la Géographie Minéralogique des Environs de Paris* (Par. 1811; new ed. with enlargements, 1822; 3d ed. 1835). Among his other works may be mentioned his *Essai d'une Classification des Reptiles* (Par. 1805), his *Traité Élémentaire de Minéralogie* (Par. 1807), and his *Traité des Arts Céramiques* (Par. 1845; 2d ed. 1854).—**B. Adolphe Théodore**, son of the preceding, and a foreign member of the Royal Society of London, was born in 1801, and was appointed Professor of Botany at the Muséum d'Histoire Naturelle, Paris, in 1833. He died at Paris, Feb. 19, 1876. His principal work is *Histoire des Végétaux Fossiles* (2 vols. Par. 1828-47).

Bronn, Heinrich Georg, a German naturalist, was born March 3, 1800, at Ziegelhausen, near Heidelberg, where he became professor in 1828. He died 5th July 1862. B.'s chief works are *System der urweltlichen Konchylien* (1824); *Lethæa Geognostica* (1852-56, 6 vols. with atlas); *Geschichte der Natur* (1841-49); *Allgemeine Zoologie* (1850); and *Die Klassen und Ordnungen des Thierreichs* (1858).

Bron'te, a town of Sicily, in the province of Catania, at the foot of Mount Etna, in a rich wine district, has manufactures of cottons, woollens, oil, paper, &c. Pop. 11,800. In 1779 Lord Nelson was created Duke of B., with a yearly income of about £3750 (6000 *oncie*), by the Neapolitan Government.

Bron'tö, Charlotte, the daughter of a clergyman of the Church of England, of Irish extraction, whose proper name was Prunty, was born at Thornton, in Yorkshire, 21st April 1816. In 1821 the family removed to Ilworth, and the parsonage of this little village was the scene of their sad domestic tragedy. In 1822, Mrs. B., and, a few years later, her two eldest daughters, died. The father was erratic and injudicious. The son's irregular life was the cause of hardship and anxiety. The three surviving daughters, Charlotte, Emily, and Anne, were constrained to endeavour to earn a livelihood by teaching, a struggle for which they were not well prepared. Charlotte had spent a year at Cowan Bridge School—afterwards introduced into *Jane Eyre* as Lowood—and two years at Roehead, under the kindly care of Miss Wooler. Their experience as governesses did not encourage them to persevere, and the sisters returned to their home at Haworth. In 1846 they published a volume of poems under the assumed names of Ellis, Acton, and Currer Bell, and immediately afterwards appeared *Jane Eyre*, *Wuthering Heights*, *Agnes Grey*, and *The Professor*. *Jane Eyre*, 'that masterwork of a great genius,' was at once almost a magical success. The author's heart was, however, saddened by the death of her brother, and of her sister Emily in 1848, and of Anne in the following year. In 1850 she paid a visit to London, of which Thackeray writes: 'New to the London world, she entered it with an independent, indomitable spirit of her own. She gave me the impression of being a very pure and lofty and high-minded person. A great and holy reverence of right and truth seemed to be with her always.' *Shirley* had appeared in 1849, and was followed in 1852 by *Villette*. In 1854, Charlotte was married to Mr. Nicholls, her father's curate, and died 31st March 1855. See *The Life of C. B.* by Mrs. Gaskell (Lond. 1857); a *Monograph* (Lond. 1876) by Wemyss Reid; a *Note on C. B.* (Lond. 1877) by A. C. Swinburne.

Bronze. Under the general denomination B. are included all the Alloys (q. v.) of copper and tin. The most important of these are *gun-metal*, *bell-metal*, *speculum-metal*, *B. for ornaments*, and *B. for coins*. The colour and other physical properties of the different bronzes vary with the proportion of the two

ingredients. As the quantity of tin increases, the alloy becomes harder and at the same time lighter in colour. In the manufacture of B. care must be taken to fuse the metal as rapidly as possible, otherwise the tin becomes oxidised and lost; and immediately before casting, the metal must be stirred to ensure uniformity of composition, and rapidly cooled in the mould, otherwise there is a danger of the ingredients separating from one another. The green colour, or *patina antiqua*, so highly prized on B. ornaments, is produced by the action of atmospheric air and moisture, but may be imitated by repeatedly washing the clean object with a solution of *sal ammoniac* and *salt of sorrel* in vinegar. B. has been known from early ages, and at one time was employed in the manufacture of almost every article now made of iron. That period has been called the *Bronze Age* (q. v.). The art of casting B. was first introduced by Theodoros and Roccos of Samos, about 700 B.C. The following shows the composition of the more important kinds of B. :—

	Copper.	Tin.
Copper coins of the present day	95'0	4'0
Ancient sword-blade from Ireland	91'4	8'4
Gun-metal	90'5	9'5
Bell-metal	78'0	22'0
Speculum metal	66'6	33'4

It should be remarked that B. for ornamental purposes is generally alloyed with small quantities of zinc, lead, and iron.

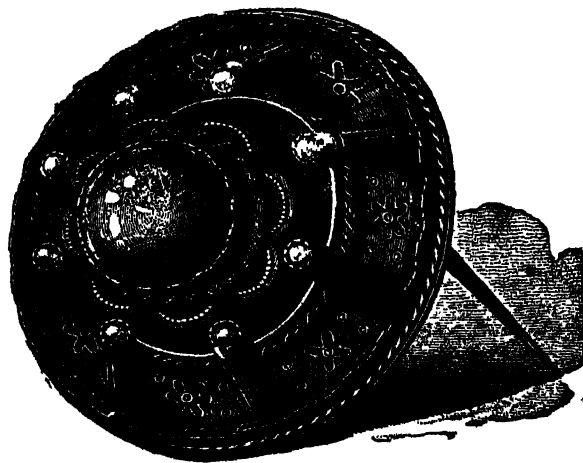
Bronze Age, the term applied by palæontologists and archaeologists to the middle division of the human or recent period in geology, distinguished by the presence in the recent formations of instruments of bronze which were used by primitive or prehistoric man. This classification or division of the human period into the ages of Stone, Bronze, and Iron, is founded on the method employed by the Danish antiquaries. The term B. A. is rendered by the Danish *Broncealderen*. The researches incidental to the history of primitive man at this point are undertaken conjointly by the geologist and antiquary. The B. A., in Sir John Lubbock's classification of the human period (see his *Prehistoric Man*), would be included in his *Neolithic* division, or the newer epoch of the period. The instruments characteristic of the B. A., it is to be remarked, were not formed solely of that metal, since stone implements of improved shape are frequently found associated with the bronze ones, and indicate that whilst the use of metals was known and cultivated, the bronze implements did not wholly supersede the ruder stone weapons. The classification into the age of Stone, Bronze, and Iron, whilst a convenient one, is not therefore to be taken as strictly meaning that during these respective periods none but stone, bronze, and iron weapons were used. At the same time, the arrangement serves to show that an actual progress from the ruder stone to the fashioning of metals existed, and typified the rise of primitive man from rude barbarism to a semi-civilised state. In the peat-mosses of Denmark, especially in their newer or more recent portions, bronze implements occur, and in the later *Pfahlbauten*, or Swiss lake-dwellings, the B. A. is also represented by characteristic weapons. In British deposits, the progress from the Stone to the B. A. is less satisfactorily traced. See Chantre's *Age du Bronze* (4 vols. Par. 1877).

Bronze Wing, Bronze-Winged Pigeon, Bronze Pigeon, the popular names of certain kinds of pigeons in Australia, belonging to the family *Peristerina*, and natural order *Columbida*. The bronze-winged ground-dove (*Phaps* or *Columba chalcoptera*) is the most common species. It is about 15 inches long, and is found in most parts of Australia (except the extreme S.), as well as in some of the South Sea Islands. It frequents sandy spots, and is usually seen on the ground, though occasionally it perches on shrubs. It coos very loudly. Of the other species of B. P., the chief are the Little B. P. (*P. or C. elegans*), which has a more southerly range than *P. chalcoptera*, and frequents marshy places; and the Harlequin B. P. (*P. or C. histrionica*), found in the northern parts of New South Wales. See PARTRIDGE-PIGEON.

Bron'zing is a term used to denote the imparting of a bronze-like appearance to articles of metal, wood, plaster, &c., by means of bronze powders. Finely-divided gold forms an ingredient in some of the more expensive powders. *Copper powder* is prepared from a saturated nitrous acid solution of copper, by

inserting into the liquid small iron bars, which precipitate the copper in a pulverised state. *Gold size* is commonly applied to the article to be bronzed before laying on the powder, and to prepare it gum animi, in a fine state of division, is boiled with linseed oil, vermilion being added to render it opaque before use. In the process of B., the article is covered with gold size diluted with turpentine, and when nearly dry the powder is applied with a piece of soft leather as a brush; when quite dry the superfluous powder is wiped off. An agreeable reddish-brown colour may be communicated to copper medals and other articles by boiling them in vinegar containing two parts of verdigris and one part of sal-ammoniac. Peroxide of iron, made into a paste, with dilute solution of acetate of copper, rubbed over copper vessels, on heating, imparts to them a thin film of sub-oxide of copper, which greatly improves their appearance. Gun-barrels are browned with chloride or butter of antimony rubbed on the slightly-heated iron.

Brooch (Fr. *broche*, a spit or knitting-needle), an appendage of dress, at once useful and ornamental, composed essentially of a pin or skewer mounted in a ring, boss, or other metallic frame. The modern brooch is the representative of the *fibula* which was used by the ancient Romans. Brooches are, and have always been, made usually of gold or silver, worked in highly artistic patterns; and further, in modern times, they are set with jewels and precious stones. From their employment in fastening the cloak, mantle, or plaid at the neck or over the shoulder, they have been in all times a characteristic and essential ornament of both sexes of the Celtic races. Many interesting Celtic brooches belonging to prehistoric and to early Christian times are in public institutions, or kept as prized heirlooms in families, some of them showing wonderful artistic skill and workmanship. One of the most famous is the B. of Lorn, belonging to the



Lorn Brooch.

family of Macdougall of Lorn, which, tradition says, was left in the hands of a foeman by Robert Bruce when he was defeated at Methven.

Brooke, Henry, dramatist and novelist, was a native of Ireland, and was born in 1706 at Rantavon, in county Cavan. He was educated for the bar in London, where he became the friend of Swift, Pope, and Lyttleton. From an early age he had shown a faculty for making verses, and in 1732 published a poem called *Universal Beauty*, in which he was believed to have been assisted by Pope. His next work was the unequal drama of *Gustavus Vasa*, by which he made £1000. Returning to Ireland in 1740, he obtained the post of Barrack-master, wrote numerous books, and died in Dublin, 10th October 1783. The only one of his works which has survived to the present time is his novel of *The Fool of Quality*, of which the late Canon Kingsley published an edition in 1859.—**Charlotte B.**, daughter of the preceding, was an enthusiastic student of the Irish

tongue, and published in 1789 *Reliques of Irish Poetry, consisting of Heroic Poems, Odes, Elegies, and Songs, translated into English Verse, with Notes Explanatory and Historical, and the Originals in the Irish Character*. She also edited an edition of her father's works and wrote his Life. Miss B. died 29th March 1793.

Brooke, Sir James, born at Benares, 29th April 1803, was educated at Norwich, and served some time in the Burmese war of 1822-24. Having resolved to attempt the suppression of piracy in the Malay Archipelago, in the inhabitants of which he had become interested, he set sail from London in October 1838, in his yacht *Royalist*, with a crew of seventeen seamen, a naturalist, and a surveyor, and reached Sarawak, in the N.W. of Borneo, in August 1839. The district was then disturbed by revolt against the Sultan Omar Ali-Sapudin, represented in Sarawak by the Rajah Muda Hassim. B. accordingly spent the next year in a voyage round the Gulf of Boni, in Celebes, where he obtained much interesting information, both geographical and bearing on the habits and institutions of the Bugis, Wajo, and Winhoka inhabitants. Returning to Sarawak in 1840, after a long negotiation, B. got himself appointed rajah, and immediately published a code, addressed to Malays, Dyaks, and Chinese, guaranteeing free communication and free trade (except in antimony), enforcing the ondong-ondong (or ancient written law of Borneo) against murder and other heinous crimes, and promising a currency. The Dyak customs of 'taking heads' and of Babuhid presented much difficulty. In 1843 the sultan made the cession of Sarawak perpetual. B.'s vigour in repressing piracy by 'head-money' created a feeling against him in England, which had disappeared when he visited this country in 1847, received the Order of the Bath, and was made Governor of Labuan, a post he held for many years along with his rajahship. In 1857 the Chinese, who had previously acted most dishonestly with reference to the antimony concessions, and who were now enraged by the restrictions on the opium trade, made a serious revolt, which, however, B. completely crushed. He then returned to England, and by lectures and deputations urged on Lord Derby's Government, as he had previously suggested to Sir R. Peel, that they should acquire Sarawak from him, and thus extend the treasures of coal they had found in Labuan, and open up a junk trade with China. The project was not entertained, although B. had made Sarawak a place of thriving trade, which, standing on the Indian-China steam-route, is destined to have great influence on the trade between Europe and China. B. was succeeded by his son as rajah, and died in England, 11th June 1868. See *Private Letters of Sir J. B.* (3 vols. Lond. 1853; the *Narrative of Captain Keppel*; and G. L. Jacob's *Rajah of Sarawak* (Lond. 2 vols. 1877).

Brooklime (*Veronica Baccabunga*), a species of Speedwell (q. v.), found in streams, ditches, and wet places in Britain. The leaves and young shoots are frequently used in salads, and sold with watercress. In Scotland it is sometimes called the *Water Paspie*.

Brooklyn, a city on Long Island, state of New York. It is separated from New York city by the East River, an arm of the sea connecting Long Island Sound with New York Harbour. It is named from Breuchelen ('broken land'), in Holland, and was first settled by the Dutch in 1625; but in 1800 its pop. was only 3298; in 1830 it was 15,292; in 1850, 96,850; in 1870, 396,105; and 1875, 482,687. B. has a bold bluff looking towards New York called the Heights, on which are many fine residences. A great many New Yorkers reside in B., and this accounts for the number of its churches, on account of which it is called the 'City of Churches.' It has a navy-yard covering 45 acres, besides possessing magnificent docks. B. has also many ferries across to New York, distant three-quarters of a mile. A lofty bridge is now being built to span the East River and join the two cities.

Brooks, Charles Shirley, journalist and litterateur, was the son of an architect, and was born at Brill, in Oxfordshire, about the year 1816. After leaving school, he was articled to an attorney, but soon took to literature as a profession. For a long time he wrote the 'parliamentary summary' for the *Morning Chronicle*, and otherwise contributed to that journal. He also produced plays, such as *Our New Governess*, and novels, of which *The Gordian Knot* and *Aspen Court* are among the most popular. B. was an active contributor to *Punch* from

its commencement, and succeeded the late Mr Mark Lemon as its editor in 1870. He died February 23, 1874. He was a singularly painstaking author and a genial man.

Broom, a popular name given to various closely-allied genera, *Genista*, *Cytisus*, and *Spartium*, of the natural order *Leguminosæ* (sub-order *Papilionaceæ*), but in Britain generally limited to the common B. (*Cytisus* or *Sarothamnus scoparius*). The twigs are bitter and nauseous, but powerfully diuretic, and are accordingly used in dropsy. The plant is also slightly laxative, and, in large doses, emetic. The genus *Cytisus* is a large one, extending over Europe and the Mediterranean region to the Canary Islands. The Irish B. of gardens (*C. patens*) is not a native of Ireland, but of Portugal. The Spanish B., also known as the B.-rush (though this name is usually reserved for *Viminaria*), is *Spartium junceum*; it possesses properties much the same as the common B. The Portugal or white B. (*C. albus*) is a native of the Mediterranean countries. Another white-flowered species cultivated in our shrubberies is *S. monospermum*, a native of the sandy coasts of Spain, and of Africa S. of the great desert. Like *C. albus*, its twigs, when beaten, steeped, and washed, yield a good fibre. There are various other cultivated species of B., many from the Canary Islands. African B. is a common name for *Aspalathus*; Dyer's B. is *Genista tinctoria*; New Zealand B., *Carmichaelia Australis*, &c.

Broom-Corn, a cultivated grass, probably a variety of the sorghum (*S. saccharatum*) from which sugar is manufactured. It is now extensively cultivated in N. America, into which it was introduced by Benjamin Franklin, for the purpose of making whisks or brooms from the tops of its stems and branches. Though originally brought from the E. Indies, it now flourishes in the United States, where the religious sect of Shakers devote much of their attention to its cultivation. In 1860, about 30,000 acres, chiefly in the states of Ohio, New York, and Illinois, were devoted to this crop—the value of the produce being about 1,390,000 dollars. Since then the acreage under broom-grass has much increased. See *Report of the Commission of Agriculture U.S.A.*, 1874.

Broom-Rape. See OROBANCHE.

Bro'sa Beds, a series of strata of the same age as the inferior oolite of Yorkshire, occurring at Brora, in Sutherlandshire, and its neighbourhood. One of the oldest known workable deposits of oolitic coal was opened there at the close of the 16th c. It is coal of fair quality, the seam being 3½ feet thick.

Bros'imum. See BREAD-NUTS, COW-TREE, and SNAKE-WOOD.

Brosses, Charles de, a French historian and archaeologist, born at Dijon, 17th June 1709. As the result of a visit to Italy, he published at Dijon, in 1750, *Lettres sur l'Etat Actuel de la Ville d'Herкуланum*, the earliest treatise on the subject. His *Traité de la Formation Mécanique des Langues* (2 vols. 1765) has been of essential value to subsequent investigators, though some of its hypotheses have not been accepted. Other works are *Histoire de Navigation aux Terres Australes* (2 vols. 1756), *Dissertation sur le Culte des Dieux Fétiches* (1760), and *Histoire du Septième Siècle de la République Romaine* (3 vols. Dijon, 1777). His attempts to supply the lacuna of Sallust from a recension of about 700 fragments which he had collected occupied a great portion of the life of B., but the work was not completed at his death, March 17, 1777. His was a busy life. In addition to his labours as an author, he performed the functions of a magistrate, was president of the Parliament of Dijon, a member of the Academy of Inscriptions, and carried on an extensive correspondence with the savans of the day. See Villemain's *Tableau de la Littérature au dix-huitième Siècle*. B.'s correspondence with Voltaire was published in 1836.

Broth, a kind of food prepared by boiling together fresh meat, culinary vegetables, and frequently barley or rice, in a large proportion of water, till the vegetables are perfectly soft, and in a condition to be easily assimilated. The principal vegetables used in B. are onions, leeks, green peas, carrots, and turnips; but cabbage and greens are also sometimes used, and in certain districts of Scotland 'kail' is made in which greens only is used. Two favourite dishes of Scotch nationality are hotchpotch, an *olla podrida* of vegetables with chopped mutton,

and cockie-leekie, a broth prepared from the flesh of fowls and leeks, to which the judicious add prunes for flavour.

Brotherhoods, Religious, lay associations, instituted for pious and benevolent purposes, probably in imitation of the spiritual orders, were very numerous during the middle ages, especially in Italy—Rome alone having more than a hundred. Some came into existence and continued under the patronage of the Church, while others either did not seek her countenance, or lost it, and some even fell under her displeasure and were severely persecuted. Some of the best known are the Beguines (q. v.) and Beghards, the Brethren of the Cross,—of the Free Spirit,—of the Common Life,—of Alexius or the Lollards, &c.

Brothers and Sisters of Charity were associations at first of lay brothers and sisters for tending the sick and the destitute. The order of Brothers of Charity was founded at Seville in 1540 by the Portuguese João di Dio, afterwards canonised, and received the rule of St Augustine from Pope Pius V. 1572, and all the privileges of the mendicant orders in 1624, when it was divided into two congregations, a Spanish and an Italian one. The European brothers wear a black dress, those in America wear brown, and have a distinct General. The order of the Sisters of Charity was founded (1634) in France by Vincent de Paul, assisted by Madame le Gras. It was recognised by the Pope in 1655, and in 1685 had 224 convents. Nearly destroyed by the Revolution, the order was restored by Napoleon in 1807, and now does good service in supplying elementary education in rural France. Branches of the same order or associations very similar have also hospitals in most of the principal cities of Christendom.

Brothers, Law of Succession among. By the law of England, if A die, leaving no descendants, his father is his heir-at-law; but failing his father, A is succeeded by his eldest brother and his descendants; then comes A's next brother and descendants, and so on to the youngest brother and descendants. Failing these, then A is succeeded by his sisters equally as coparceners. In Scotland, the law is different. A would not be succeeded by his father; nor, unless A was the eldest son of his father, would he be succeeded by his oldest brother. He is in all cases succeeded by the brother immediately younger than himself, followed by that younger brother's descendants. On the exhaustion of A's younger brothers and descendants, A's immediately older brother and descendants come in, and so on up to A's eldest brother, who is the last of all in the succession. There is an exception, however, to this order of succession in Scotland, where the estate has been purchased by the deceased brother. In this case it is called *Conquest*, and it goes to the immediately elder brother, on whose death it goes according to ordinary rules. See INTESACY; STATUTES OF DISTRIBUTION; KIN, NEXT OF; SUCCESSION.

Brothers, Lay, an inferior class of monks, employed as servants in Monasteries (q. v.). Though not in holy orders, they were bound by monastic rules.

Brothers, Richard, a half-crazed visionary, born about 1760, attracted much attention by his warnings and prophecies. He styled himself the 'nephew of the Almighty and prince of the Hebrews, appointed to lead them to the land of Canaan,' and his chief writings were *A Revealed Knowledge of the Prophecies and Times* (1794) and *An Exposition of the Trinity* (1795). He was confined for some time in Newgate, and later in Bedlam, but was ultimately released, and died January 25, 1824.

Brougham, Henry, Baron Brougham and Vaux, a conspicuous lawyer and statesman, was born in Edinburgh, 19th September 1778. His father was Mr Henry Brougham, a member of an ancient Westmoreland family, and his mother, Eleonora Syme, a niece of Robertson the historian. B. was educated at the High School and University of Edinburgh, distinguishing himself in mathematics, and passed at the Scotch bar in 1800. He had, however, little or no practice in Edinburgh, and his most notable achievement there was helping Jeffrey, Sydney Smith, and Horner to start (1802) the *Edinburgh Review*, to which he became one of the most active and vigorous contributors, and on almost every subject under the sun. B., after waiting seven years in Edinburgh, betook himself to London, passed at Lincoln's Inn in 1808, and soon obtained a considerable practice,

attracting especial attention by an appearance he made at the bar of the House of Commons, where he appeared for some merchants of Liverpool to ask the repeal of the Orders in Council. Entering Parliament in 1810, he at once took a high place there as an orator, an advocate of political and social, more especially educational, reform, and as an opponent of the slave trade. By the manner in which, along with Denman, he conducted the defence of Queen Caroline (1820-21), he became for a time the most popular man in England. His boldness in this trial, however, excluded him from professional promotion until 1830, when he became Lord Chancellor in the reforming ministry of that year. In this post he distinguished himself as the pioneer of law reform, while his audacity and eloquence aided greatly in passing the Reform Act of 1832. On the fall of the ministry of which he was a member in 1834, he retired from office, and never returned to it, although his voice was frequently heard as the fearless advocate of progress and law reform, and the critic of all administrations. Outside of Parliament he continued to display that interest in social matters which he had shown as a member of the House of Commons, when he took a leading part in the establishment of the University of London, and in the starting of those mechanics' institutes which have done something (if not much) for the technical education of the country. Towards the close of his life many honours were bestowed upon him, among them being the honorary posts of Lord Rector of Glasgow University, and Chancellor of that of Edinburgh. B. died at Cannes, in the S. of France, May 7, 1868. He had married, in 1819, Mary Anne Eden, the granddaughter of a baronet in the county of Durham, by whom he had two daughters, who both died before their father. The peerage has descended to the family of a brother of Lord B. B.'s leading characteristic was his enormous energy. It showed itself in his oratory; he surpassed every speaker of his time in declamation and invective, and it must also be added in diffuseness and rhodomontade. It showed itself in his capacity for reading and writing vigorously about all, even the most abstruse subjects; he was equally at home in theology, metaphysics, and physical science. B. was a wonderful example of what can be done by a strong head, backed by an equally strong will, that sets itself to master a great variety of subjects. Nevertheless, it is more than doubtful if he has made a single original or important contribution to any of the sciences with which his fervent intellect grappled. His works (11 vols. 1868) were published by Messrs A. & C. Black, Edinburgh. See also *B.'s Autobiography*, published by the same firm under the title of *Life and Times* (3 vols. 1871).

Broughty-Ferry, a town of Forfarshire, 4 miles E. of Dundee, connected with Ferry-Port-on-Craig by a railway-ferry across the Firth of Tay, thus bringing the Dundee and Arbroath and Dundee and Forfar railways into conjunction with the Fife lines. An old castle, lately repaired for the defence of the Tay, stands on the shore. On the slope N.W. of the town are numerous fine villas, the residences of Dundee merchants and manufacturers. Pop. (1871) 5817.

Broussonetia, a genus of plants belonging to the natural order *Moraceæ* (q. v.). *B. papyrifera* (the paper mulberry) is used in China, Japan, &c., for the manufacture of paper. From its inner bark the South Sea Islanders make a kind of cloth.

Broussais, François Joseph Victor, a celebrated French physician, was born at St Malo, December 17, 1772. He was educated at Dinon, and after serving as naval and military surgeon, became Professor of Pathology at Paris in 1832. He was elected member of the Institute, and died at Vitry, November 17, 1838. B. called his doctrine *Médecine Physiologique*, and it was adopted by a school of physiologists. He regarded *irritability* as the fundamental property of all living animal tissues, and declared that every malady proceeded from an increase or diminution of that property. *Inflammation* was held to be the secret of functional and organic disorders; and for that, local phlebotomy was practised as a remedy. B.'s theory is now considered partial and extreme, but in France was widely prevalent. His chief works are *Histoire des Phlegmasies chroniques* (Par. 1808); *Examen de la Doctrine Médicale généralement adoptée* (1816), and *Traité de Physiologie appliquée à la Pathologie* (1822). See *Éloge de B.*, by Dubois d'Amiens, and *Histoire Critique de la Doctrine Physiologique de B.*, by Costez. B.'s son, **Ossimir B.**, born in 1803, is author of several memoirs supporting his father's views. He died in 1847.

Brown, a pigment formed of unequal proportions of red, blue, and yellow, the former being in excess. In painting, the minerals asphaltum, bistre, umber, terra di sienna, Mars B., Cassel earth, B. madder, &c., are employed either in a raw or burnt state. A B. colour is communicated to pottery and porcelain by chromate of iron or antimony, lead, and manganese. In dyeing and calico-printing, B. is produced from catechu, madder with mixture of iron and red liquor mordants, and with the aniline B. commercially termed *Bismark B.*

Brown, Charles Brookden, an American author, was born of a Quaker family, in Philadelphia, January 17, 1771; studied for the legal profession, but soon devoted himself exclusively to literature. In 1797 he published his first work, *Alcwin*, a dialogue on the rights of women. In 1798 followed *Wieland*. During the same year the city of New York was scourged with yellow fever, and B. bravely remained to nurse his friends, and to be himself prostrated by the plague. He afterwards embodied his experiences in *Arthur Mervyn*. B. had great facility in writing, and threw off *Ormond*, *Edgar Huntly*, *The Sleep-Walker*, *Clara Howard*, *Jane Talbot*, in rapid succession. In 1806 he brought out the first Annual Register in America. He died at Philadelphia, February 22, 1810.

B. had a morbid but rather powerful imagination, with a tendency to psychological romance. His works, once much admired both in his own country and in England, and undoubtedly exercising a certain impress on some American authors, have now 'fallen into the portion of weeds and outworn fables.'

Brown, Ford Madox, an English painter, at one time an ally of the pre-Raphaelites, born at Calais in 1821, was educated on the Continent, and exhibited two cartoons at Westminster Hall in 1844. His 'King Lear,' a work of wonderful power, feeling, and technical dexterity (1849), was followed by 'Chaucer at the Court of Edward III.' (1851), and 'Christ Washing Peter's Feet' (1852), both of which received the Liverpool prize of £50. An exhibition of B.'s works, which was opened in London in 1865, included, among many other pictures, 'The Last of England' (a work of fine pathos and humour, representing character and incident on board an emigrant ship passing the Dover cliffs), 'The Autumn Afternoon,' 'Work,' and 'Wilhelmus Bonquestor;' and since that time his chief works have been 'The Coat of many Colours,' 'Romeo and Juliet,' 'Cordeia's Portion,' 'Don Juan,' and 'Jacopo Foscari.' His son, **Oliver Madox B.**, author of *Gabriel Denver* (1873), and a painter and *littérateur* of great talent and promise, died in 1874. His *Literary Remains* were published, with an accompanying memoir, by William Rossetti (2 vols. Lond. 1876).

Brown, John, of Haddington, was born in 1722, at Carpow, Abernethy, Perthshire. His father was in humble life and of limited acquirements, and the son spent but a short time at school. At the early age of eleven B. lost both his parents, and became a 'herd' under the charge of a pious shepherd named Ogilvie. In the midst of pastoral employments he prosecuted the study of Latin and Greek with untiring diligence. Then he became a pedlar, was afterwards a teacher, and studied philosophy and divinity under Ebenezer Erskine of the Secession Church. In June 1751 he was ordained over the Burgher Secession congregation in Haddington, and in 1768 was appointed Professor of Divinity in his denomination. He died 19th June 1787. B. was an ardent student, with a liberal passion for languages, and in the course of his life acquired a respectable knowledge of Arabic, Syriac, Persian, Ethiopic, French, German, Dutch, and Italian. He first appeared as an author in 1758, with an *Essay on the Confession of Faith*. Ten years later he published a *Dictionary of the Bible*, which plain people still find useful. In 1778 he produced *The Self-Interpreting Bible*, which has made his name a household word in Scotland, and in 1783 a *Concordance of the Bible*. B. wrote many other works which no longer merit notice; but his life and character are more than admirable. Though not a man of genius, or even of great intellect, he had excellent sense, pure feeling, and genuine piety. He was a typical Scot and Presbyterian, both in the circumscription of his mind and the strength of his convictions. Perhaps the greatest, certainly one of the most accomplished, of the Scotch Seceders, he has left a profound impression of his worth on the mind of the graver portion of the Scottish people.

Brown, John, D.D., grandson of the above, was born July 12, 1784, at Whitburn, Linlithgowshire, and was ordained minister of the Secession U.P. Church, Biggar, in 1806. Translated to Edinburgh in 1822, he was appointed Professor of Exegetical Theology to his denomination in 1834, an office which he continued to hold when the 'Secession' joined with the Relief (1847) to form the U.P. Church. He died October 13, 1858. B. was a man of fine, even noble, presence, had great power as a preacher, and gave a fresh impulse to the exegetical study of the Scriptures in Scotland. His best works are *The Resurrection of Life, Expository Discourses on the Epistles of Peter, on Galatians, and on Romans*. Two of his sons have attained distinction—(1) **John B.** (born 1810), author of *Home Subjunctiva* (1858), containing, among other things, *Rab and his Friends*, a character sketch of singular power and pathos; (2) **A. Orum B.** now (1876) Professor of Chemistry in the University of Edinburgh.

Brown, Captain John, of Harper's Ferry insurrection, was born in Torrington, Conn., U.S., May 9, 1800. An enthusiast in the cause of anti-slavery, he went to Kansas in 1854. There he entered earnestly into the contest with the South, and had a son killed. He then came E., revolving some larger plans for freedom, and in October 1859 surprised the country by making an assault on the arsenal of Harper's Ferry, Virginia. B. had collected a force of seventeen whites and five blacks, and with this small force he captured the arsenal, but was soon overpowered. He was tried for high treason, and hung, December 2, 1859. There were moral elements of a high kind in B., and he became the prophet and hero of the impending conflict for the freedom of the blacks. See Greeley's *American Conflict* (1865).

Brown, Robert, son of Anthony B. of Folthrop, Rutland, was born at Northampton in 1549. He was educated at Corpus Christi College, Cambridge, and became a preacher and teacher at Islington. About 1580 he began to declaim against the polity and Liturgy of the Church of England, and founded an Independent church in Norwich. He was arrested, but his friend Cecil set him free. He then went to Holland and formed a church at Middleburgh. Returning to England in 1589, he entered the Church of England, and was presented to the rectory of Oundle in Northamptonshire in 1590; but his conformity was of short duration. After a long, turbulent, and, on the whole, discreditable career, he died in Northampton jail in 1630, whither he had been sent, at the age of eighty, for maltreating a constable. B. wrote a treatise on *Reformation*, and another on the *Life and Manners of True Christians*. He was the founder of the sect of 'Brownists,' who afterwards, under John Robinson, became the Independents or Puritans, and planted the New England Colonies. B. boasted that he had been thirty-two times in prison; but any merit there may be in this is destroyed by what Fuller tells us, that B. had a wife with whom he did not live, and drew the revenues of a church in which he did not preach.

Brown, Robert, a distinguished botanist, born at Montrose, 21st December 1773, and educated at Aberdeen and Edinburgh University. After serving as an army surgeon, he devoted himself solely to botany, and, as naturalist, accompanied an expedition sent to explore the Australian coast in 1801. On his return he brought with him nearly 4000 species of plants, many of which were absolutely new to botanists. Appointed librarian to the Linnean Society, he was elected F.R.S. in 1811, D.C.L. in 1832, and President of the Linnean Society in 1849. He died in London, June 10, 1858. B.'s botanical investigations and his contributions to the *Transactions* of various societies established his right to the title bestowed on him by Humboldt, '*Botanicorum facile princeps*.' Through B.'s example and influence the natural system of Jussieu was substituted for that of Linneus. Among his works are *Podromus Flora, Novae Hollandiæ*, and *General Remarks on the Botany of Terra Australis*.

Brown, Samuel, M.D., son of Samuel B., founder of itinerating libraries, and grandson of John B. of Haddington, was born in that town, February 23, 1817. He entered the Edinburgh University in 1832, and took the degree of M.D. in 1839. Having chosen chemistry for his life study, he aimed at reconstructing the science of atomics. In 1843 the chair of Chemistry in

Edinburgh University became vacant, and B., who was a candidate, unfortunately staked his success on proving the isomerism of carbon and silicon. Having failed in his experiments, he withdrew his application, and, with a certain sad sternness, devoted himself to a life of hopeless experiment in his laboratory at Portobello. He was cheered in his austere retirement by the friendship of Hamilton, Carlyle, Emerson, and De Quincey, and sometimes came forth to lecture on scientific subjects. He died of consumption, September 20, 1857. B. had a fine poetic and philosophic genius, which was never destined to find adequate expression on earth. His *Tragedy of Galileo* (1850) was unquestionably a failure; but the searching and subtle quality of his genius is visible in his *Lay Sermons on the Theory of Christianity* (1841-42), and in his *Lectures on the Atomic Theory*, and *Essays Scientific and Literary* (2 vols. Edinb. 1858).

Brown, Thomas, the well-known Scottish metaphysician, was born at Kirkcubrecht, in Kirkcudbright, January 9, 1778. He was educated in London, and in 1794 entered the University of Edinburgh, where he pursued various studies, and from which in 1803 he received the degree of M.D. He subsequently practised medicine for some years in partnership with Dr Gregory of Edinburgh; but his devotion to literature and philosophy led to his being selected, in 1810, as the colleague and successor of Dugald Stewart in the chair of Moral Philosophy in the University of Edinburgh. After filling this position for ten years, his health declined, and he died in London, April 2, 1820. His first work, entitled *Observations on the Zoonomia of Dr Darwin*, 'the almost unmatched work,' says Sir James Mackintosh, 'of a boy of nineteen,' appeared in 1798. This was followed in 1803 by two volumes of poems; and between 1814 and 1819 he published six poetical works, but his poetry was never popular. He was one of the founders of the *Edinburgh Review*, and wrote the article on Kant in the second number. His pamphlet on the Leslie controversy appeared in 1818, greatly enlarged as *An Inquiry into the Relation of Cause and Effect*. The work, however, by which he is best known is the *Lectures on the Philosophy of Mind*, delivered to his college class. They were hastily composed at first, and were not subsequently altered, but they were listened to with enthusiasm, and have passed through numerous editions. B. criticised and endeavoured to supersede the psychology of Reid and Stewart, insisting particularly that all the mental phenomena gave the mind itself existing in different states, that consciousness is merely a general name, expressive of the whole variety of our feelings, that our muscular frame is truly an organ of sense, that our knowledge of the primary qualities of matter is derived from a muscular affection, and that sensations and perceptions equally can be nothing else than they are felt to be. The lectures owe their chief charm to their acute analysis, refined feeling, and fervid, if somewhat florid, eloquence. B.'s Life was written by Dr Welsh, and a searching criticism of his contributions to philosophy is contained in Sir William Hamilton's *Discussions*.

Brown Coal, or Lignite, a variety of coal which may be considered to occupy an intermediate place between peat and bituminous coal, found in the more recent geological formations, and, indeed, restricted by some authorities to the products of Tertiary deposits. It is mostly of a yellowish or brown colour, and frequently retains a good deal of the structure and appearance of wood. Deposits of B. C. are widely distributed throughout the world, and those in Germany are of much industrial importance, as some of them yield on distillation a very large percentage of paraffin. B. C. is a highly hygroscopic substance, which depreciates its value as fuel. Excluding ash and water, the following is the composition of the B. C. of Bovey, Devonshire:—Carbon, 69.53; hydrogen, 5.91; oxygen and nitrogen, 24.56.

Brown Spar, a name applied by mineralogists more especially to those varieties of brown crystallised Dolomite (q. v.) which contain carbonate of iron. But generally B. S. is a magnesian carbonate of limestone tinged by oxide of iron and manganese. It is sometimes called *pearl spar*, owing to its pearly lustre.

Brown University, a flourishing institution in Providence, Rhode Island, U.S., was founded in 1764, under the name of Rhode Island College, being the seventh in point of age among the colleges of the United States. It afterwards received a large gift from Nicholas Brown, Esq., and took his name. B. U.

is under the control of the Baptists, but the professorships are open to all Protestants. E. G. Robinson, D.D., LL.D., is president (1875).

Browne, Charles Foster ('Artemus Ward'), was born at Waterford, Maine, U.S., about 1834, and began to write for the press while settled in Boston. Afterwards he went to Toledo and Cleveland, Ohio, where his letters, by 'Artemus Ward,' attracted attention. In 1860 he became a writer to *Vanity Fair*, a comic paper in New York, and subsequently lectured at Salt Lake City and California. In 1866 he came to London, lectured on the 'Mormons,' and wrote for *Punch*. He died at Southampton, March 6, 1867. B. was of an amiable character, and had great social qualities. His chief works are *Artemus Ward, his Book*, and *Artemus Ward among the Mormons*. Perhaps the most humorous chapters are those on the *Shakers*, and on *Sacrificing his Relatives for the War*. The crazy oddities of his spelling have induced fastidious critics to deny his humour, but it was really genuine, though not rich or deep.

Browne, Sir Thomas, one of our most original prose writers, was born at London, 19th October 1605. After studying at Winchester, Oxford, and on the Continent, he settled as a physician at Norwich, where he spent the rest of his life. During the civil wars and the Protectorate he remained in learned seclusion, indifferent to either party. He was knighted in 1671, and died on his birthday, 19th October 1682. B.'s chief works are *Religio Medici* (1642), *Pseudodoxia Epidemica, or Inquiry into Vulgar and Common Errors* (1646), *Hydriotaphia, or the Urn Burial*, and *The Garden of Cyrus* (1658). De Quincey ranks B. with Jeremy Taylor as the most rich and dazzling of rhetoricians. His writings contain passages of gorgeous eloquence and profound solemnity, but his style is encumbered by unique Latinisms and recondite allusions. His rich, sombre imagination loved to brood upon dim mysteries, antique grandeurs, fantastic oddities, and quaint, insoluble riddles. His gloomy meditations on life, death, time, and oblivion, are at once pathetic and impressive. The best account of B. is that in Bulwer Lytton's *Quarterly Essays*. A complete edition of B.'s works was published at London (4 vols. 1836).

Browne, William, a pastoral poet, was born at Tavistock, Devonshire, in 1590. He studied at Oxford and at the Temple, became tutor to the Earl of Carnarvon, and died at Ottery-St-Mary, Devonshire, in 1645. His works consist of *Britannia's Pastorals* (1613 and 1616), *The Shepherd's Pipe*, from which Milton is said to have borrowed in *Lycidas*, and *The Inner Temple Masque* (1620). B. was a follower of Spenser, whom he resembles in sensuous richness of description and diffuseness of style. In *Britannia's Pastorals*, which are written in heroic couplets, B. excels nearly all his contemporaries as a pleasing and truthful painter of English scenery. His works were edited by Davies (Lond. 1772), and are found in Anderson's *English Poets*. For a critical estimate of B., see Leigh Hunt's *Jar of Honey from Mount Hybla*.

Brownie, in Scotland a spirit corresponding to the English Puck or Robin Goodfellow, and the Irish Leprechaun. See FAIRIES.

Browning, Elizabeth Barrett, the greatest English poetess hitherto, born in London in 1809, was the most highly-educated and cultured woman of her time, and published a translation of the *Prometheus* of Æschylus in 1833. In 1838 appeared her *Seraphim and other Poems*, in the chief of which the artistic form is Greek, while the thought is Christian. Married to Robert Browning in 1846, she cultivated the poetic art with increased assiduity in subsequent years. Her later works are *Casa Guidi Windows* (1851), *Aurora Leigh* (1856), *Poems before Congress* (1860). She died at Florence, 29th June 1861. The first collected edition of her poems appeared as early as 1844; later and complete editions are those of 1850, 1853, and 1864-66. Her verse is remarkable at once for spontaneous tenderness and artistic ingenuity. Many of her lyrics and minor pieces are imperishable. Her *Letters* in 2 vols. appeared in 1877.

Browning, Robert, poet, was born at Camberwell in 1812, studied at London University, and published the dramatic poem of *Paracelsus* in 1835, which some praised, but few read. *Pippa Passes*, which appeared in 1842, obtained a kind of dim recognition from a perplexed public. In the interval B. attempted

to write for the stage, but the failure of *Strafford* (1837) and of *Sordello* (1839) showed him to be deficient in the constructive faculty. But in his *Men and Women* (1855) a wonderful power of analysing thought and passion, and a rapidity, certainty, and brightness of conception, are conspicuously shown. Those who place B. above Tennyson in point of genius find here the best evidence for their estimate. *Romances and Lyrics* (1845), and *A Soul's Tragedy* (1846), are less notable performances. There is much elaborate conceit in his later works, of which may be mentioned *Dramatis Persona* (1864), *The Ring and the Book* (1868), *Balaustion's Adventure* (1871), *Prince Hohenstiel-Schwangau* (1871), *Fifine at the Fair* (1872), *Red Cotton Nightcap Country* (1873), *Aristophanes' Apology* (1875), and *The Inn Album* (1875), *La Saisiaz: the Two Poets of Croisic* (Lond. 1878) and *Dramatic Idylls* (1879), the last three of which contain some of B.'s finest and most powerful poetry.

Bruce, the surname of a celebrated Scotch family that took its rise in Robert de Bruis, a Norman knight who accompanied William the Conqueror to England. His grandson, also Robert de Brus, received from King David I. of Scotland a part of the lordship of Annandale, which, however, he gave up to his son Robert on the outbreak of the war between Stephen and Matilda, niece of the Scottish king. The Lord of Annandale had two sons—Robert, who died without issue, and William, whose son Robert, fourth Lord of Annandale, by marrying Isabel, second daughter of David, Earl of Huntingdon, younger brother of William the Lion, became the founder of the royal family of B. He died in 1245.

ROBERT DE B., LORD OF ANNANDALE, fifth Lord of Annandale, and competitor with John Baliol for the crown of Scotland, was born in 1210. During the minority of Alexander III., he was one of the fifteen regents of Scotland, and in 1290, when the throne became vacant by the death of Margaret, the 'Maiden of Norway,' he claimed it, as being the grandson, by his mother Isabel, of David, Earl of Huntingdon, younger brother of William the Lion. Edward I. decided in favour of Baliol, 1292. To escape the indignity of swearing fealty to his successful rival, B. resigned the lordship of Annandale to his son. He died at his castle of Lochmaben in 1295.

ROBERT DE B., EARL OF CARRICK, eldest son of the above, was a favourite of Edward I., and accompanied him to Palestine in 1269. In 1271 he married Martha Margaret, Countess of Carrick, and thus obtained the title by which he is known. He lived chiefly in England after Edward I. decided the Scotch succession against his father, and became Constable of Carlisle. He fought against Baliol when the latter revolted, and asked the crown, but was refused. His death took place in 1304.

ROBERT B., the greatest of the kings of Scotland, and son of Robert, Earl of Carrick, was born March 21, 1274, at (it is generally believed) Lochmaben. In 1296, as Earl of Carrick, he swore fealty to Edward I., and for many years occupied a somewhat doubtful position in Scotland, sometimes siding with the other Scotch leaders in their efforts to secure the independence of their country, and then returning to his allegiance to Edward. In 1306 a quarrel with John Comyn, commonly known as the Red Comyn, nephew of John Baliol, and a rival claimant of the throne, which ended in his stabbing him (4th February) in the church of the Minorite or Grey Friars, Dumfries, compelled him to draw the sword for his country, and throw away the scabbard. He publicly asserted his rights to the throne, and was crowned king at Scone (27th March). At first, however, misfortune attended his efforts. Defeated in Perthshire (18th June) by a superior English force under the Earl of Pembroke, and again in the wastes of Athole by Alexander Macdougall, Lord of Lorn, uncle of the Red Comyn, he was reduced to such straits that he had to take refuge during the winter in the island of Rathlin, off the N. coast of Ireland. His queen fell into the hands of the English, his estates were confiscated, he was excommunicated, and even believed to be dead. In the spring of 1307, however, he landed on the Carrick coast, and captured his own castle of Turnberry from the English. His followers now began to increase in numbers, and on May 10, 1307, he overthrew his former opponent, the Earl of Pembroke, at Loudon Hill. This was the first of a series of successes, which in five years cleared all Scotland, except a few fortresses, of the English. B. now retaliated on England by invading it, and reduced the Isle of Man. The decisive conflict of the war, however, did not take place till

1314, when Edward II., marching at the head of an enormous force, numbering, it is said, 100,000 men, to relieve Stirling Castle, held by Sir Philip Mowbray for England, was completely routed (24th June) on the field of Bannockburn, with the loss of 30,000 men, by the Scots, who numbered, including camp-followers, about 40,000, and whose king that day displayed all the skill of an accomplished commander, and all the reckless daring of a private soldier. The war did not end then. Several invasions of England had to take place, and Edward had to be beaten once again at Biland Abbey, Yorkshire, before a truce was agreed to; nor was it until March 4, 1328, in the reign of Edward III., that a final treaty was ratified by a Parliament at Northampton, which recognised the independence of Scotland and B.'s right to the throne. The iron frame of the king had, however, been wasted by years of hardship and struggle, and succumbed to the disease of leprosy. He died at Cardross Castle, on the northern bank of the Firth of Clyde, June 7, 1329, in the fifty-fifth year of his age, and twenty-third of his reign. He was succeeded by his son David, whose mother was his second wife, Elizabeth, daughter of Aymer de Burgh, Earl of Ulster. By his first wife, Isabella, daughter of Donald, Earl of Mar, he had a daughter, Marjory, who married Walter, High Steward of Scotland, and became the mother of Robert II. B.'s body was interred in the Abbey Church of Dunfermline, where his bones were discovered in 1818. His heart was delivered to his trusty follower, Sir James Douglas, to be taken to Palestine and buried in Jerusalem; but Douglas, falling in battle against the Moors in Spain, the heart was brought back to Scotland, and buried in the Monastery of Melrose. For everything relating to the career of B. we are indebted to Barbour (q. v.), whose work was at once accepted by his countrymen as a truthful narrative of the great struggle. See Burton's *History of Scotland*, Palgrave's *Documents illustrating the History of Scotland*, and Freeman's *Historical Essays* ('*Relations between the Crowns of England and Scotland*').

EDWARD B., the gallant but too impetuous brother of Robert I., distinguished himself greatly in the Scotch War of Independence. In 1315 he crossed with 6000 men from Ayr to Ireland, to assist the native *septs* or clans against the English, was crowned King of Ireland at Carrickfergus, and for a time more than held his own. He was defeated, however, at Athenree in 1316, and fell in battle near Dundalk, October 5, 1317.

DAVID B., son of King Robert B., succeeded him at the age of five in 1329, and, along with his wife Joanna, daughter of Edward II., was crowned king at Scone in 1331. Driven from the throne by Edward Baliol in 1333, he was sent for safety to France, whence he returned in 1342. Taking advantage of the absence of Edward III. in France, B. invaded England in 1346, but was defeated and taken prisoner at Neville's Cross, near Durham. He was not released till 1350, when he was ransomed for 100,000 marks. B. died February 22, 1371, in Edinburgh Castle.

Bruce, James, a famous traveller, was born at Kinnaird House, Stirlingshire, December 14, 1730, and educated at Harrow School and at Edinburgh University, where for some time he studied law. He did not, however, follow the profession, but in 1754 entered into partnership with a Mr Allan, a London wine merchant, whose daughter he married in the same year. Within a few months his wife died, and in 1758, by the death of his father, he succeeded to the Kinnaird estate. He withdrew from trade in 1761; was appointed consul-general at Algiers in 1763; remained there for nearly two years studying Oriental languages and medicine; and in 1768 set out to explore the Nile sources. After crossing the desert from Cairo to the Red Sea, and wandering for some time in Arabia Felix, he successfully traced the Bahr-el-Azrek (Blue Nile), then regarded as the main stream, to its source. He reached Gondar, the capital of Abyssinia, where in 1770 he captivated the Emperor by his skill in physic, and served for some time in the army, making his escape with difficulty after two years' residence. In 1773 he returned to England, and published his *Travels to Discover the Sources of the Nile in the Years 1763-73* (5 vols. 4to, 1790), containing much curious and startling information, received with a widespread incredulity which recent travel has shown to be unjust. B. died at Kinnaird, April 27, 1794.

Bruce, Michael, a Scottish poet, was born 27th March 1746, at Kinrosswood, Kinross-shire, of humble parentage. Destined for the ministry, he was educated in spite of poverty at

Edinburgh University; but died of consumption, 6th July 1767, at the age of twenty-one. His few poems are in a strain of chastened sadness; and his best-known, the 'Elegy,' written shortly before his death, has a pathos peculiarly affecting. The first edition was published by his friend Logan (Edinb. 1770), who unfortunately inserted some pieces of his own, and hence a controversy, not yet decided, regarding the authorship of one of the finest and most popular poems in the English language, *Ode to the Cuckoo*. See Grosart's edition of B.'s poems, with memoir (Edinb. 1865).

Brucea, a genus of shrubs belonging to the natural order *Simarubaceæ* (q. v.), though by some referred to the allied orders *Xanthoxylaceæ* (q. v.) and *Rutaceæ* (q. v.). The root of *B. quasiosides*, a native of the Himalayas, is used as a substitute for quassia. The leaves of *B. antidysenterica* of Abyssinia, and *B. Sumatrana* of the Indian Archipelago, China, &c., are said to be tonic, astringent, and useful in dysentery.

Bruch'sal ('the bridge over the Sal'), a walled town in the circle of Carlsruhe, Baden, on the Salbach, 25 miles S. of Heidelberg by rail. It has a considerable wine trade, and contains an old castle, a palace of the Grand Dukes of Baden, and a large reformatory and prison. Pop. (1873) 9762.

Bruceine is an Alkaloid (q. v.) contained along with strychnine in the different varieties of *strychnos*, and in considerable quantity unaccompanied by strychnine in the *false Angustura bark* (formerly supposed to be *Brucea antidysenterica*, whence the name of the alkaloid). B. is a colourless crystalline substance, and combines with acids to form crystalline salts. Its action on the animal economy is similar to that of strychnine, but is less energetic. A drop of nitric acid colours its solution deep red (difference between it and strychnine). Its chemical composition is expressed by the formula $C_{23}H_{25}N_3O_4$.

Brück'enaui ('Brook-bridge'), a village of Bavaria, on the Sinn, 36 miles N.E. of Würzburg, noted for its baths, which are situated in a beautiful valley encircled with fine woods, 2 miles W. of the village. Pop. 1571.

Bruges ('the place of bridges'), a walled city, capital of the province of W. Flanders, Belgium, 8 miles from the sea, and 12 W. of Ostend by railway. It has been the see of a bishop since 1559, is oval shaped, and has broad streets, which wear, however, a semi-deserted appearance. A great part of B. dates from the middle ages, and its houses are often richly ornamented. Its notable public buildings are the Church of Notre Dame, which has a tower 400 feet high, and contains in one of its chapels the beautiful gilded statues of Charles the Bold and his daughter, wife of Maximilian; the Hospital of St John, in which are Memling's finest pictures; the cloth and flesh markets (the *Halles*), built in 1364, over which rises to a height of 348 feet the famous Belfry of B., with the finest peal of bells (forty-seven) in the world; the Gothic town-hall, of date 1377, the repository of a public library of 15,000 volumes and 580 MSS., the façade of which supports 48 statues of the Counts and Countesses of Flanders; the Craenenburg, now a tavern, where the Emperor Maximilian was imprisoned for six weeks in 1488; and the palace of the Counts of Flanders, built in 1534, and now used as archives. The Gothic Cathedral of St Sauveur, an interesting building of the 13th c., no longer exists. The B. Academy contains a rare collection of the works of Van Eyck, Memling, &c., and the town library is remarkable for numerous works printed by Colard Mansion, the teacher of Caxton. Within the town there are as many as 52 bridges—a circumstance from which it has taken its name, B. being a French form of the Dutch *brug* (Ger. *brücke*), 'a bridge.' B. formerly employed some 16,000 skilled artisans, and has still manufactures of linen, cottons, woollens, lace, sugar, spirits, leather, and tobacco. Its harbour, *Sijns* ('sluice'), lies 9 miles N.E., in Zeeland, on the Zwin, with which B. is connected by a canal navigable for large ships. B. is also one of the Belgian railway centres, and the place where the Ostend, Ghent, Ypres, Nieupoort, and Veurne canals converge. The women have always been famed for their beauty. Pop. (1870) 47,621, of whom about one-third are military. B. is supposed to have been a place of some note as early as the 3d c., and probably received the gospel from St Chrysolus. It was the capital of Flanders in the 7th c., and in the 12th c. had become a haven of importance. In the following century it was the

chief of the Hanse towns, and monopolised the English wool trade. It reached its greatest prosperity at the beginning of the 15th c., by which time it had become the foremost commercial city in the world, and had over 200,000 inhabitants. The splendid court of the Dukes of Burgundy was then held at B., and there also resided here as many as twenty foreign ambassadors. The subsequent decline of B. was partly due to the rise of Antwerp. In 1794 it fell into the hands of the French, returned to the Netherlands in 1815, and remained with Belgium in 1830. See Weale, *B. et ses Environs* (new ed. Brug. 1875).

Brugg, or Bruck ('the bridge'), a fortified town in the Swiss canton of Aargau, on the Aar, 10 miles N.E. of Aarau. In its vicinity is the Castle of Habsburg or Hapsburg, and the Abbey of Königsfelden, founded in 1310, in the vaults of which are buried many of the Austrian royal family. Pop. (1870) 1338. B. occupies the site of the ancient *Vindonissa*, one of the most important towns of the Alemanni, and later on an episcopal see, which disappeared during the devastations of the dark ages.

Brühl, an old walled town of Rhenish Prussia, about 9 miles S.S.W. from Cologne, has a splendid château, erected by Elector Clement Augustus of Bavaria in the beginning of the 18th c. Pop. (1872) 2293. Mazarin resided here after his banishment from France in 1651.

Brühl, Heinrich, Count von, favourite and prime minister of August III., King of Poland and Elector of Saxony, born at Weissenfels, 13th Aug. 1700, commenced life as a page at the court of Elizabeth, Duchess of Sachsen-Weissenfels. His engaging manners secured for him the patronage of August II. and August III. in succession, and in 1747 he became prime minister and factotum, to use Carlyle's expression, to the latter. He completely controlled the king by ministering, at the expense of the state, to his love of ease and luxury. He did not neglect to enrich himself, however, and maintained a retinue of 200 servants, and an establishment more magnificent than that of his master. He had a suit of clothes for every day of the year, and kept twelve tailors continually sewing for him. His reckless extravagance so exhausted the public finances, that the puny army he equipped for his master against Friedrich of Prussia was captured with its camp. Augustus and B. fled to Poland, carrying with them the pictures and the porcelain, but abandoning the national archives to the conqueror. B. died at Dresden, 28th October 1764. His library of 62,000 vols. (sold for 60,000 crowns) forms an important part of the royal library of Dresden. See Justi's *Leben und Charakter der Grafen von B.* (3 vols. 1760-64), and Carlyle's *Friedrich II.*, *passim*.

Brumaire (Lat. *bruma*, 'winter'), a month in the French Revolutionary calendar. On the celebrated 18th B. (November 9), 1799, Napoleon overthrew the Directory, and on the following day was proclaimed First Consul.

Brummel, Beau, a consummate dandy, who took society by storm in the early part of the present century, was born in 1778. He resolved to be the best-dressed man in London, devoted the most assiduous care to his toilet, and saw the fashionable world bow before his creaseless coat and artistic arrangement of cravat. For a time he rivalled in celebrity Lord Byron, who sarcastically pronounced him to be a very great man. He was intimate with the Regent, and was courted as an authority on matters peculiar to polite society; but, after ten years of social success, was ruined by gambling, and died in poverty and imbecility at Caen, 29th March 1840. He fully realised Carlyle's description of a dandy—'a man whose trade, office, and existence consists in the wearing of clothes.' His life was written by Captain Jesse (1844), and is a valuable satire on his times.

Brunck, Richard François Philippe, an eminent philologist, and a most subtle, though frequently rash, critic, was born at Strasburg, December 30, 1729. He was educated by the Jesuits, and took part for a time in the Seven Years' War, but subsequently returned to his native city, and ardently devoted himself to the study of the Greek authors, and to the emendation of their writings. His first work was the *Analecta Veterum Poetarum Græcorum* (1772-76); and he subsequently issued editions of Anacreon (1785), Apollonius Rhodius (1780), Aristophanes (1781-83), the *Peda Gnomici* (1784), Virgil (1785), and Sophocles (1786-89), the last named being especially famous.

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B. was for some time in prison during the French Revolution, in which he was engaged on the popular side. He died June 12, 1803.

Brune, Guillaume Marie Anne, a marshal of France, born at Brives-la-Gaillarde, March 13, 1763, and though of good family, was originally a printer, but rose to be one of the first generals of his time. In 1796 he was made general of brigade in the army of Italy under Napoleon, defeated the Swiss in 1798, established the Helvetic Republic, crushed the Anglo-Russian forces at Bergen, forced the Duke of York to capitulate on humiliating terms at Alkmaar, October 19, 1799, and vanquished the chiefs of the Vendée in 1800. He was appointed commander-in-chief of the army which entered Italy (1800) after the fall of Berne, and governor-general of the Hanse towns in 1806, but was disgraced for having omitted Napoleon's titles in the text of the treaty by which the island of Rugen was ceded by Sweden to France. After a long period of retirement, he joined Napoleon during the 'Hundred Days,' and took part in the battle of Waterloo. B. was put to death at Avignon, August 2, 1815, by an infuriated mob, on the false charge of being a 'terrorist of 1793.' See *La Vie du Maréchal B.* (Par. 1821).

Brunel, Sir Marc Isambard, a famous engineer, was born at Hacquerville, in Normandy, April 25, 1769. Educated for the Church, he early showed his passion for science, and was placed in the navy, as likely to prove a more congenial career. During the Revolution he was compelled to take refuge in America, where he supported himself as a civil engineer. In 1799 he came to England, and induced the Government to adopt his machinery for making ship-blocks, previously made by hand. This machinery was marvellously perfect and ingenious, and still remains in use. B.'s mechanical inventions were both very numerous and highly original. His greatest work, however, was the Thames Tunnel, to the carrying out of which (undaunted by two previous failures and abundance of evil prognostications) he devoted his best energies for many years. It was begun in 1824, and opened, after many difficulties, in 1843. B. was a Fellow, and afterwards a Vice-President, of the Royal Society, and was knighted in 1841. He died December 12, 1849. See Beamish's *Memoir of Sir Marc Isambard B.* (Lond. 1862).—**Isambard Kingdom B.**, son of the preceding, born at Portsmouth, 9th April 1806, became one of the most eminent engineers of his day. He assisted his father greatly in the construction of the Thames Tunnel. He became engineer of the Great Western Railway, and there introduced the broad gauge. He was the engineer of the *Great Western, Great Britain*, and *Great Eastern* steamships—each of them the largest vessels of their day—and was an early advocate of iron ships and screw propulsion. B. died 15th September 1859, his life having been shortened by over-exertion.

Brunelleschi, Filippo, an Italian architect, born at Florence in 1377. His genius was wonderfully versatile. He studied in turn painting, mathematics, mechanics, and perspective, the last of which he taught to Masaccio, the first painter who knew its principles scientifically. A careful study of the ruins of Rome filled him with the desire of reviving the architecture of the ancients; and when it was proposed in 1419 to complete the cathedral of Florence, B. suggested the construction of a cupola 130 feet in diameter, and 330 feet from the floor to the cross, a proposal considered at the time so impracticable that B. was regarded as a madman, but which he nevertheless succeeded in carrying into effect. The dome of St Peter's at Rome, executed a century and a half later by Michael Angelo, was a reproduction of the idea of B., who owed much of his success as an architect to his knowledge of mathematics. The churches of San Lorenzo and San Spirito at Florence are also striking testimonies to the originality of his genius. He died in 1444. See Quatremère de Quincy's *Vies des Architectes*.

Bru'ni, Leonardo, known as *Aretino*, from being a native of Arezzo, was one of the famous Italian humanists who brought about the revival of Greek learning in Western Europe. Born in 1369, he devoted himself ardently to Greek literature, abandoning for it the study of jurisprudence. After having been secretary to four popes, he returned to Florence on the deposition of John XXIII., and was for the second time chancellor of the republic, at his death, 9th March 1444. His *Historia Florentina*, written in Latin, was printed at Strasburg in 1610, but an

Italian translation by Acciajuoli was published at Venice in 1473. His other works, which are numerous, are now almost forgotten. Among these are his *Commentarius Rerum suo Tempore Gestarum* (Ven. 1476); *Vite di Dante e del Petrarca* (Perugia, 1671), &c. B. translated into Latin Aristotle, Plutarch, and other Greek authors.

Brünn (Slav. *Brno*), the capital of Moravia, in the Austro-Hungarian empire, lies at the confluence of the Zvittawa and Schwarzwawa, 60 miles N. of Vienna by rail. The principal buildings are the cathedral, the Gothic church of St Jakob, with a tower 276 feet high, built 1318, a Protestant church erected in 1867, and a museum of antiquities. There are also many palaces, and to the west of B. stands the Spielberg (formerly the castle of the Markgraf), since 1740 a state prison, and still a citadel. It has important manufactures of woollens, cottons, silk, ribbons, leather, dye-stuffs, tobacco, soap, and glass. The town has fourteen suburbs. Pop. (Behm and Vagner, *Bevölkerung der Erde*, 1875) 73,771.

Brunnen, a village in the canton of Schwyz, Switzerland, at the S.E. bend of the Lake of Lucerne, and historically interesting as the place where the deputies of the Forest Cantons constituted their free commonwealth in 1315. Pop. (1870) 2274.

Brunnow, **Ernst Phil. von**, a distinguished Russian diplomatist of German origin, was born at Dresden, 31st August 1797. He began his studies at Leipsic in 1815, entered the Russian service in 1818, assisted at the congresses of Troppau and Laybach, was secretary to the embassy at London, and was present in the campaigns against the Turks in 1828 and 1829. In 1839 he was sent on a special mission to London, and accredited as ambassador in 1840. In July of this year he brought about a treaty with England on the Eastern question, and in 1849 was employed in settling the terms of the Navigation Treaty. B. was one of the representatives of Russia at the conference held at Paris in February 1856 to re-establish peace. After holding for some time the appointment of ambassador at Berlin, he was again sent in 1858 as Russian ambassador to London, and created a count by the Russian Emperor in April 1871. He died at Darmstadt, 11th April 1875.

Bruno, **Giordano**, a philosopher whose unhappy fate has added to his fame, was born at Nola in 1548. He was for some time a Dominican, but rejecting transubstantiation, he left the Church, and wandered through Geneva, Paris, England, Marburg, Frankfurt, &c., lecturing against the logic and physics of Aristotle, and maintaining the Copernican theory. In England (1583), where he composed his chief Italian works, he knew Sir Philip Sidney and was patronised by Queen Elizabeth. He describes Oxford in *Cena delle Ceneri*, or 'Evening Conversations on Ash Wednesday.' At Frankfurt (1588-90) he published three Latin works. On coming to Venice, he was denounced to the Inquisition, and sent to San Severina, the Grand Inquisitor at Rome. He submitted to the Church, and professed penitence as regards heresy on dogmatic points, distinguishing between metaphysical discussion and practical faith. But he would not retract his scientific doctrine of the plurality of worlds. In the Venetian account of the charge against B., it is said that he praised the Queen of England and other heretic sovereigns, and had written things concerning religion which were not becoming, even though he spake philosophically. After lying in the dungeons at Rome from 1593 to 1600, he was burned in the Campo di Fiora on 17th February of the latter year. B.'s contributions to pantheism are contained in his books *Della Causa Principio ed Uno* and *Del Infinito Universo e Mondi*. His deity is by necessity immanent in nature; and he has therefore been called the 'successor of the Neo-Platonists and the precursor of Spinoza' (Lewes). He opposes Pythagoras, Plato, and Lucretius to the authority of Aristotle. Among his lighter works, the aggressive satire against a 'superstitious orthodoxy without morality and without belief,' *Spaccio della Bestia Trionfante* (translated by Toland into English in 1713), is the most characteristic. B. employs humorous dialogue, and sometimes a sonnet, to advance his argument. The best edition of his works is that by Adolf Wagner (Leips. 1830). The most elaborate criticism is by Bartholinus (2 vols. Par. 1848). There is also a life by Berti (Flor. 1868).

Bruno, called *the Great*, Archbishop of Cologne and Duke of Lorraine, was son of Heinrich the Fowler, Emperor of Ger-

many. He was born in 925, and had for tutor Baldric, Bishop of Utrecht. B. was famed for his learning and piety, and wrote a *Commentary on the Evangelists* and *On the Life of Moses, Lives of Saints*, &c. The Emperor Otto I., his brother, made him Duke of Lorraine. He died at Rheims in 965.

Bruno, **St.**, was born at Cologne about the middle of the 11th c. Disgusted with the immorality of the times, he retired to a desert near Grenoble, called *Chartreuse*, and founded (1086) an order of monks—called, from the place, Carthusian (q. v.)—adopting the rule of St Benedict, with the addition of a number of very austere precepts. B. was invited to Rome in 1092 by Pope Urban II., but found the life there so little to his mind that he retired to the wilds of Calabria, where he established another monastery, and where he died in 1101. See *Le Père Tracy's Vie de Saint Bruno* (Par. 1786).

Brunswick, **Duchy of**, a N. German state, with an area of 1420 sq. miles, and a pop. (1871) of 312,170. It consists chiefly of three isolated portions—(1) the principality of Wolfenbüttel, subdivided into the circles of B., Wolfenbüttel, and Helmstedt; (2) the Harz and Weser region, subdivided into the circles of Gandersheim and Holzminden; and (3) the principality of Blankenburg, in the Lower Harz. There are also five small demesnes, the largest of which is Calvörde, in the Magdeburg territory. Wolfenbüttel, the most northerly part of B., is chiefly an elevated plateau, covered with elm and beech forests, and watered by the Oker. The other two divisions are traversed by the Harz Mountains, and contain the peaks Wormberg (3200 ft.) and Achtermannshöhe (2800 ft.). The Weser forms the boundary on the W. of Holzminden. Chief among the natural products are flax (yearly, 84,000 Ger. stones), hops, timber, potatoes, tobacco, and fruit. Silver, lead, copper, coal (near Helmstedt), and iron are extensively mined; and there are quarries of marble, alabaster, and limestone. The cities B. and Holzminden are the most active industrial centres, and the principal manufactures are yarn, linen, paper, glass, wooden wares, sugar, tobacco, and porcelain. There are also some ninety-six breweries, and many foundries and machine factories. The inhabitants are in great part of the 'Old Saxon' stock, to which also belonged in part the Low German conquerors of Britain. They are mainly Lutherans, there being besides (1872) only 7030 Catholics, 2793 adherents of the Reformed Church, 1171 Jews, and 574 members of small sects. There are over 400 village schools, six gymnasia, a university at Göttingen, and several technical and other schools. In 1873 there were throughout B. over 150 miles of railway, entirely the property of the state. B. is a limited monarchy by decrees of October 12, 1832, and November 22, 23, 1851, and the legislature is vested in the Duke and an elective assembly of forty-six deputies, elected for six years. The assembly only meets once every three years, a permanent committee of seven deputies being appointed to carry on the incidental business of the state, while the administration is in the hands of three ministers. It sends two members to the National Bundesrath, and three deputies to the Reichstag. The revenue for the triennial term 1873-75 was £433,381, and in 1873 the public debt amounted to £3,971,666, of which £1,321,110 has been contracted on railways.

B. formed part of Charlemagne's Saxon 'dukedom,' incorporated with the Frankish empire after years of hard fighting, and shared its fortunes, passing to the Guelphs of Swabia in 1137. Along with Lüneburg it remained the hereditary possession of Heinrich the Lion till his death in 1195. Otto, nephew of Otto IV. of Germany, and grandson of Heinrich the Lion, procured a grant from Friedrich II. by which B. was raised to a duchy in 1235. The sons of Otto, Johann and Albrecht, were respectively the founders of the *ältere Lüneburger* and *ältere Braunschweiger* lines, the former of which became extinct in 1369. The reigning house of B.-Wolfenbüttel was founded in 1569 by Heinrich, Duke of B.-Lüneburg-Dannenberg, and from his brother Wilhelm sprang the B.-Lüneburg line, which later became the house of Hanover (q. v.), and has given kings to Great Britain since the beginning of the 18th c. See the histories of Havemann (3 vols. Gött. 1853-37), Schaumann (Hanov. 1864), and Lambrecht (1874).

Brunswick (Ger. *Braunschweig*, 'Bruno's shed,' or town of B.), the capital of the duchy, on the Oker, in a fertile plain, 105 miles W.S.W. of Berlin, and directly connected by rail with

Hanover, Harzburg, and Magdeburg. B. has a Gothic town-hall, a handsome town-church, a Church of St Andrew, with a steeple 316 feet high, a medical college, a polytechnic school, a museum, and a theatre. In the principal public square are the statues of Heinrich the Lion and of Lessing, the latter by Rietschel. It has large manufactures of woollens, linens, beet-sugar, chicory, tobacco, and papier-mâché, while its beer (*munne*) is celebrated. Pop. (1871) 57,883, of whom 46,000 are Lutherans. B. was founded in 861 by Bruno, one of the early Dukes of Saxony, flourished as one of the original five towns of the Hanse League, but declined during the 15th c. It was conquered in 1671 by the Duke Rudolf August, and has been the residence of the ducal family since 1753. The Duke's palace, destroyed by fire in 1830, and again in 1865, was rebuilt in 1869, and is a beautiful edifice, with a quadrangle designed by Rietschel. See Dürre, *Geschichte B.s* (Biuns. 1861).

Brunswick Bay, the estuary of Prince Regent river, on the N.W. coast of Australia.

Brunswick Black, composed of lamp-black and turpentine, is employed for imparting a jet-black appearance to grates and other iron articles. A finer variety is called Berlin black.

Brunswick Green, a native earthy carbonate of copper, yielding a beautiful green colour, is employed in oil-painting under this name. Real B. G. is an oxychloride of copper, prepared by acting on that metal with hydrochloric acid; it has a pale bluish-green hue, and is useful in the arts.

Bru'sa, Brusa, or Bursa, capital of the vilayet of the same name, at the base of the Mysian Olympus. It is a clean town, with channels of water running through many of its streets. A mountain stream divides the Turkish from the Armenian quarter, while a ravine separates the latter from the Greek quarter. There are good bazaars, well stocked with Manchester and other European goods. Many of the houses are of wood, but there are several handsome buildings, the most remarkable of which is the great mosque. The environs are beautiful, the city standing on a slope facing a plain, variegated with mulberry plantations, gardens, clumps of cypress, kiosks, baths, &c. Its hot springs, famous in antiquity, are still used. Pop. estimated at 60,000, mostly Turks, though there are many Armenians, besides Greeks, Jews, and Franks. B. has an extensive trade in raw silk, and a striped satin is manufactured here, from which the under-garments of the Easterns is made. There is an important trade in corn, opium, and meerschaum clay, and its commerce is increasing. Its port is Gemlik. B. is the ancient *Prusa*, and is said by Strabo to have been built by Prusias, who carried on a war against Cæsar; but according to Pliny it was built by Hannibal. Its importance commenced after its capture, in 1326, by Orcan, son of Osman I., who made it the capital of the empire of the Osmanlis, which it remained for fully a century. The vilayet of B. has an area of 28,870 sq. miles; and a pop. of upwards of 1,000,000.

Brussels (Fr. *Bruxelles*, anc. *Brucosella*, 'the seat of the marsh'), the capital of Belgium, province of S. Brabant, on the Senne, a branch of the Dyle, lies partly on a hill and partly in a plain of great beauty. The modern or upper town is the residence of the higher classes, and has a fine park, the resort of the fashionable, of 18 acres, around which are situated many of the most notable buildings, such as the palaces of the King of the Belgians, of the Duke of Brabant, of the Prince of Orange (now the *Palais des Beaux Arts*), and the *Palais de Nation*, the house of the Legislature. In the low-lying part of B., inhabited chiefly by Flemish merchants and shopkeepers, there are many old and picturesque buildings. Among the chief public buildings of B. are the Palace of Industry, the Mint, the University (since 1834), the Academy of Science and Art, a fine cathedral of St. Michel and St. Gudule (13th c.), the new Exchange (1868-74), covering 3200 sq. metres; the National Bank, of date 1864; the town-hall, with a tower 373 feet high; the bazaar of St. Hubert, and the Hospital of St. John, with beds for 600 patients. The city also possesses a military school, a music conservatoire, a school of painting and architecture, a botanical school and garden, the royal library, including the Bibliothèque de Burgogne, with 22,000 volumes, a picture-gallery, a valuable

museum, a *Hospice de Vieillards* for 700 inmates, splendid market buildings, and an astronomical observatory (1830). The old walls of B. have given place to pleasant boulevards, and the Allée Verte, a much-frequented avenue of lindens, leads to Laeken, a suburb (pop. 9200), where there is a royal castle, built in 1782, with a park and garden. Of the public squares of B., the most notable are the *Place Royale*, with a large statue of Godfrey de Bouillon; the *Place Michel* or *Place des Martyrs*, containing a monument to the 'martyrs' of 1830; the *Place Nationale*, where there is a statue of Leopold I., and the old Congress Hall, &c. The two principal streets are *Rue Royale* and *Rue de Madeleine*. Among the manufactures of B. may be mentioned point and Blondel lace, gold and silver wares, cottons, woollens, carriages, glass, and crystal, needles, hats, paper, and chemicals. B. has a great international trade, and is a commercial and railway centre. It has some twelve daily newspapers, of which the *Indépendance Belge* has a European reputation. To the W. lies Anderlecht (pop. 11,663) with large cotton factories and breweries. About one mile S. begins the Wood of Soignies, a splendid park, the *Bois de Boulogne* of B., 449 acres in extent, intersected by avenues and alleys. Between this park and the Dyle is the battlefield of June 1815, and three miles farther off lies the village of Waterloo (q. v.), in which there is now one of the largest beet-sugar factories in the country. Pop. (1873) 180,172, of whom 6000 were Protestants. Including nine suburbs, the pop. was 365,404. B. is first spoken of in chronicles of the 8th c. An established fact in its early history is the existence of a church here in 966. Otto II. held his court at B. in the 10th c., and the town was fortified in the century following. Its palace, built in 1300, was long the residence of the Dukes of Brabant, and in it Charles V. of Spain abdicated in favour of Philip II. in 1555. The subsequent cruelties of the Duke of Alba and the Inquisition, of which B. was the centre, drove some 10,000 of its citizens to seek refuge in England. During the Franco-Spanish wars of the 17th c. B. was more than once partly destroyed, but in later times made rapid progress in the peaceful reign of Maria Theresa. In 1792 it was taken by the French, who made it capital of the department of Dyle. B. was subsequently one of the capitals of the kingdom of the Netherlands, and was made the capital of Belgium at the Revolution of 1830.

Brussels Carpets. See CARPETS.

Brussels Sprouts, one of the cultivated varieties of the Cabbage (*Brassica oleracea*, q. v.). The 'sprouts' consist of little clusters of leaves which form miniature cabbages in the axils of the leaves. It is cultivated in much the same way as the cabbage. It is said to degenerate in Britain, and accordingly the seed, which is sown in February or March, is by some cultivators imported from Belgium.

Bru'tus, Lucius Junius, an early Roman hero, whose story is of a purely legendary character, was the supposed founder of the family of that name. He escaped death at the hands of his uncle Tarquin, the Proud, by feigning idiocy,—hence his surname, *Brutus*, or stupid. The oracle at Delphi intimated that he would take the place of his cousins, Titus and Aruns, as ruler at Rome. When Lucretia was killed by her father, after her foul outrage by Sextus, son of Tarquin, B. roused the people, obtained the banishment of the Tarquins, and was elected one of the first consuls. He put to death his two sons for taking part in a conspiracy to restore the Tarquins. He died fighting with Aruns, and the Roman matrons mourned him for a year.—**Marcus Junius B.** was born 85 B.C., and was educated under the care of his uncle and future father-in-law, Cato. B. joined Pompey at the outbreak of the civil war in B.C. 49; but after the battle of Pharsalia he submitted to Cæsar, and even served him, while Cato still stood out. By the influence of Cassius over his weak and vain nature, B. was prevailed upon to join the conspirators who murdered Cæsar, B.C. 44. When the feeling at Rome against the assassins became manifest, B. retired to the E., where, after passing some time at Athens, he took possession of Macedonia. Having by various means obtained men and money, he joined with Cassius to oppose the triumvirs, Octavianus, Antony, and Lepidus; but in the second battle of Philippi, B.C. 42, B. was defeated by Antony, and fell upon his own sword.—**Decimus Junius Albinus B.** served under Cæsar in Gaul, and was held by him in such esteem, that B.'s name

was found in his will as one of his heirs in the second degree. B., however, foully betrayed his generous patron, and took a leading part in his assassination. Thereafter he kept up for a short time a struggle with Antony for the province of Cisalpine Gaul. He was finally deserted by his soldiers, betrayed by Camillus, a Gaulish chief, and put to death by Antony's orders, 43 B.C.

Brüx, or **Brix**, a town of Bohemia, at the foot of the Schlossberg, on the Bila, 10 miles S.W. of Teplitz, with cotton manufactures. Near it are coal-mines, the mineral springs of Püllna and Seidlitz, and deposits of sulphate of magnesia. Pop. (1869) 6308.

Bruyère, Jean de la, a famous French author, was born at Dourdan, in Normandy, in 1644, where he held for some time the post of *Conseiller-trésorier*. Coming to Paris, he was, by the influence of Bossuet, appointed teacher of history to the Dauphin (Duke of Bourgoyne). He lived chiefly at Chantilly, Versailles, and the Hotel Condé. In 1687 he produced his celebrated *Les Caractères de Théophraste, traduits du Grec avec les Caractères, ou les Mœurs de ce Siècle*. The court society, under the Maintenon rule, afforded him abundant subject for satire, which he threw into the form of abstract delineations, under such titles as *La Belle, La Cour, Des Femmes, Des Esprits Forts*. His *Dialogues sur le Quietisme* were published in 1699. B. died 11th May 1696. See his Life by Sicard, prefixed to the Paris edition of 1827. His *Œuvres Complètes* (3 vols. 1878) form part of Hachette's splendid *Collection des Grands Écrivains de France*.

Bryant, Jacob, an English scholar, born at Plymouth in 1715, and educated at Cambridge. He became secretary to the Duke of Marlborough, whose tutor he had been; refused the Mastership of the Charterhouse that he might have leisure for study, and settled at Cypenham, near Windsor, where he spent nearly half a century in the toils and pleasures of literature. He died 14th November 1804. B.'s chief writings, which are more learned than critical, are *Analysis of Ancient Mythology* (1774-76), *Vindicia Flavianæ* (1776), *Dissertation Concerning the War of Troy* (1796), and *The Sentiments of Philo-Judæus Concerning the Logos* (1797). His last publication was *Dissertations on the Prophecy of Balaam; the Standing Still of the Sun at the Command of Joshua; the Victory of Samson over the Philistines*.

Bryant, William Cullen, the Nestor of American poets, was born at Cummington, county Hampshire, Massachusetts, U.S., November 3, 1794. He was the son of Peter B., a local physician; published translations from the Latin at ten, an original poem, *The Embargo*, at thirteen; and entered Williams' College, Massachusetts, at sixteen. Two years later he composed *Thanatopsis*, a poem of beautiful gravity, but pagan rather than Christian in its resignation to the universal doom. B. studied law, and practised in Great Barrington, Massachusetts, but in 1825 went to New York as an editor. In the following year he commenced his connection with the *Evening Post*, which he still controls. It was at that time on the Democratic side; in later years it has been Republican, but was always an advocate of free trade. The first collected edition of his poems appeared in 1832. In 1869 the veteran came forth with a metrical translation of the Iliad, and in 1871 of the Odyssey. His poetry gained him a high reputation not only in America but in Europe. Something of Wordsworth's love of nature, something of Hemans's tenderness of reflective sentiment, a classic purity of phrase, and a genuine love of the scenery and life of the New World, gave a fresh and peculiar charm to verse whose strongest point is not originality. In 1874 appeared *Among The Trees*; in 1877, at the age of eighty-three, he published a new poem, *The Flood of Tears*, in which the same note is struck as in *Thanatopsis*. B.'s latest prose work was a *Popular History of the United States* (vol. i., 1876). He died at New York, 12th June 1878.

Bryonia (*Bryonia*), a genus of plants belonging to the natural order Cucurbitaceæ. The only British species is *B. dioica* (the common B.), a frequent climber in the hedgerows of England, but not a native of Scotland or Ireland. The plant abounds in fetid, acrid juice, and is purgative and emetic. *B. alba* of middle Europe has similar properties, and the root of both is applied externally to bruises, and at one time was much in use as a cattle purgative, though unsafe from its uncertain and violent action. This is owing to the presence of a bitter extractive principle, *bryonin*. The young shoots of both species are eaten like asparagus. The fresh root is sold by herbalists under

the name of white B., or mandrake root; the true Mandrake Root (q. v.) is, however, that of *Mandragora officinalis*. In large doses it is poisonous. *B. Americana* and *B. Africana* have similar properties. The root of *B. epiga* is employed by the natives of India as an alterative in syphilis, &c., and is considered, though probably erroneously, a powerful remedy in snake-bites. The root of *B. Abyssinica* when boiled, can, it is said, be eaten with impunity. The so-called black B. is *Tamus communis*, an entirely different plant, belonging to the Yam order (*Dioscoreaceæ*). It has a large, fleshy, somewhat acrid root, which, like that of the true B., is sometimes applied externally to bruises. Internally it acts as a diuretic, and is also used as an emetic and cathartic. The shoots of this species and *T. cretica*, when boiled, can be eaten like asparagus. The seeds of *B. callosa* are used in India as a vermifuge, and yield an oil used in lamps.



Bryonia.

Bryophyllum, a genus of plants of the natural order Crassulacæ (q. v.). *B. calycinum*, a shrubby succulent species, a native of the Moluccas, is remarkable for habitually producing buds on the edges of the leaves. These buds can produce independent plants. The bog orchid (*Malaxis paludosa*), and a variety of other plants, have also the same habit. In the Radick Islands the natives rear *Arum esculentum* by planting the leaves. The leaves of *Gloxinia Gesnera*, *Achimenes*, &c., will also produce plants if a notch is cut in the thick veins. Brown's *Manual*, pp. 181, 200, 369.

Bryozoa (Gr. *bruon*, moss; *zōon*, animal), the name formerly applied to the *Polyzoa*, a class of *Molluscoidea* or *Lower Mollusca*, represented by the *Flustra* or 'sea-mats,' and allied organisms (e.g., *Bowerbankia*, q. v.). The term was applied to these truly animal organisms from their generally plant-like conformation and form. See MOLLUSCA and POLYZOA.

Bryum, a genus of mosses, many of which are natives of Britain. They grow in dense patches, on wet rocks, wet earth, bark of trees, &c., and are among the most beautiful forms of their order.

Brzesk Litov'ski, a fortified town of Russia, government of Grodno, on the Bug, 108 miles S. of Grodno. Pop. (1867) 22,493, mainly Jews. From its position B. was always an object of contention between the Russians and Poles; and here in 1794 Suwarow defeated the Polish general Sierakowski. It has an active trade, and manufactures of leather and soap.

Brzeźan, a town of Austrian Galicia, on the Lipagnita, 51 miles S.E. of Lemberg, has an old castle, and considerable leather manufactures. Pop. (1869) 7299.

Brzeźny, or **Brasheiny**, a town of Poland, government of Piotrkov, 62 miles S.W. of Warsaw, with some manufactures of woollen cloth. Pop. 6000.

Buaze', a S. African plant, of which no perfect specimen has yet reached Europe, but which is described by Livingstone as having a fibre finer and stronger than flax: a thread of it will cut the fingers rather than break.

Bubalus, or **Bubalis**, a genus of *Antelopes* (q. v.), inhabiting Barbary and N. Africa, and occasionally found in Egypt. The name B. is now scientifically employed to denote the Buffalo (q. v.) genus, the B. of the present article being similarly termed (*Antelope* or *Alcephalus bubalis*). It is popularly known in its native haunts as the 'Bekker-el-Wash,' or wild ox, and possesses an elongated head, with the ringed horns curved outwards, so as somewhat to resemble the prongs of a pitchfork. It is a gregarious animal. It averages a stag in size, and is coloured yellowish or light-brown, the tuft of the tail being coloured black.

Bubastis, an Egyptian goddess called Pasht, whom the Greeks identified with Artemis, was erroneously said to be the daughter of Osiris and Isis. The name B. is the Egyptian Pasht with the Coptic article prefixed, and the whole Græcised. The chief temple of the goddess was at Bubastis (q. v.). The animal sacred to B. was the cat.

Bubastis, an ancient Egyptian city, remains of which are found at *Tel Basta*, 'the mounds of Pasht,' so called from its high mounds, about 14 miles to the N. of Belbeys. B. is the *Pi-beseth* of Ezek. xxx. 17. The splendid temple of the goddess B. was here, and an annual procession was held in her honour.

Bubble, a name applied to any fraudulent or deceptive joint-stock project, started with an exaggerated prospectus of commercial success, for the purpose of enriching the promoters at the expense of the public. After the bursting of the South Sea Company (q. v.), the B. Act was passed with the hope of preventing similar swindles on the public. But difficulties in construing the Act led to its being repealed; and projectors of companies are now only amenable to common law.

Bubble-shell, a name popularly applied to the genus of *Gastropodous mollusca* known as *Bulla* (q. v.).

Bu'bo is the name given to inflammation of one of the glands of the groin. It may be a simple inflammation, or due to the absorption of some poison.

Bubo. See OWL.

Buccaneers, a maritime confederacy of English and French adventurers, banded against Spain and her American colonies from an early period in the 16th to the close of the 17th c. The word is derived from the Indian *boucan* (dried meat); *boucanier* thus meaning one who dries or smokes meat in the Indian fashion. At first restricted to certain settlers at Tortuga, the name was eventually applied to that strong piratical organisation which harassed Spanish power in the New World by sea and land. These 'brethren of the coast' had laws and commanders; and, from their unity of system, could inflict grave defeats on the Spaniards. Among their most distinguished captains were Montbar, a gentleman of France (called by the Spaniards *El Exterminador*); De Busco; Van Horn, a native of Ostend; and, greatest of all, Henry Morgan, by birth a Welshman. Under his leadership the B. performed their most renowned feat, the taking of Panama in 1670. Terrible atrocities stain the annals of these allied freebooters; but many of their exploits show a reckless daring which approaches the heroic. Among the last of the B. was the famous Dampier; but as the confederacy loosened, its character degenerated. The capture of Cartagena in 1697 was their final great achievement; and on the outbreak of war between England and France, and after the peace of Ryswick, this remarkable association broke up. Its remnant appeared in the vulgar pirates that continued to infest the Spanish main, and are hardly yet a thing of the past. See Dampier's *Voyages*, Burney and Thornberry's *Histories*, and the *Narratives* of Kingrove and Sharp.

Buccari, a free haven of Croatia, Austria, on the Bay of Boccarizza, Gulf of Quarnero, 5 miles E.S.E. of Fiume, with ship-building, linen manufacture, and tunny fishing. It has a good trade in wine. In 1871 there entered the port 129 vessels of 7352 tons; cleared, 127 vessels of 7116 tons. Pop. (1869) 2119.

Buccina'tor, the name of a small thin muscle situated in the wall of the cheek. It is by the action of this muscle that the exit of air from the mouth is regulated when the mouth is filled with air, as in whistling or playing on a wind instrument; hence it is called 'trumpeter's muscle,' from *buccina*, a trumpet.

Buocino, a town of S. Italy, province of Salerno, 33 miles E. of Salerno city, on the projected line of railway intended to connect Eboli and Potenza. Marble of a fine grain is quarried in the vicinity. Pop. 5493.

Buocinum, the *Whelk* genus. See WHELK.

Buocleuch. The Scotts, Dukes of B., are one of the most ancient Border families of Scotland, tracing their descent as far back as the reign of Alexander III.; but the first who attained distinction was Sir Walter Scott of Branksome, a Border chieftain whose name is well known to readers of Scottish minstrelsy, and who lived in the reign of James V. His son was in 1606 raised to the peerage as Lord B. Dignities and wealth poured in on the

family in numerous ways, till Anne of B. married the unfortunate James, Duke of Monmouth, and the pair were made Duke and Duchess of B. When her husband was beheaded in 1685, the Duchess retained her titles and estates. Her grandson Francis, who succeeded his grandfather, and who adhered to the name of Scott, succeeded to the title of Duke of B. on her death, married a daughter of James, second Duke of Queensberry, and obtained with her a portion of the Queensberry estates. His son Henry, whose tutor was Adam Smith, devoted great attention to the improvement of his estates and the amelioration of the position of his tenants, and was much esteemed in Scotland. The grandson of the latter, Walter Francis, fifth Duke of B., and present representative of the family, was born in 1806, and bears the titles of Duke of B. and Queensberry, Marquis of Dumfriesshire, Earl of Drumlanrig, &c., in Scotland, and Earl of Doncaster in England. His income from landed property in Scotland, which is situated in various counties, is larger than that of any other nobleman in the country. Like his grandfather, he is honourably noted for his exertions for the good of his tenants and the improvement of his property. Among the latter we may include the creation of the deep-water harbour and port of Granton, on the Firth of Forth, near Edinburgh, at a cost of £320,000. The Duke of B. was one of the chief patrons of Church livings in Scotland, but waived all claims to compensation when the Patronage Abolition Act of 1874 was passed. His eldest son, Walter Henry, late member of Parliament for the county of Midlothian, bears the courtesy title of Earl of Dalkeith.

Bu'centaur, the gorgeous state galley in which the Doge of Venice annually, on Ascension Day, 'married the Adriatic' by dropping a ring into the sea, and wedding it in the name of the republic. The ceremony arose in 1177 from an honour bestowed on the Doge Ziani, who defeated the fleet of Barbarossa.

Buceph'alus (Gr. *Bucephalos*, from *bucephalos*, 'bull-headed'), the favourite horse of Alexander the Great. Alexander, when a boy, tamed it, and, after carrying him through many victories, it died in India. Bucephalia, a town on the Hydaspes, was founded by Alexander in its memory.

Bu'cer, Martin, one of the most zealous fellow-labourers of Luther, was born at Schlettstadt, in Alsace, in 1491. His original name was *Kuh-horn*, of which B. is the Greek equivalent. At the age of fourteen he entered the Dominican order of monks; but, being converted to Protestantism by Luther, left it in 1521; after which he settled at Strasburg, where he became pastor and Professor of Theology. His talents for controversy and negotiation fitted him for occupying an important place in his party. He excelled in subtle distinctions, and was fertile in softened expressions to which each party could accommodate itself, and in flexible principles which favoured all. He thus played an important part in the controversy between Luther and Zwingli, seeking 'by exhortations, explanations, and perhaps also by shrouding the opinions of both parties in ambiguous language,' to mediate between the two, but without giving satisfaction to either party. In 1549 he was called to England by Cranmer, where he became Professor of Theology at Cambridge, and took part in helping forward the Reformation, along with Paul Fagius and other Reformers from the Continent. He died at Cambridge, 27th February 1551. Some years later his bones were exhumed and burned by order of Mary. A complete edition of B.'s writings in ten vols. was undertaken by Hubert, of which only one volume appeared (Basel, 1577). See Baum's *Biography of B.*, prefixed to an edition of his works published in 1858.

Bu'ceros, the genus of Hornbills (q. v.).

Buch, Leopold von, an illustrious German geologist and palæontologist, was born April 26, 1774, at Stolpe, in Prussia, educated at the Mining Academy of Freiberg, and travelled in pursuit of his science through Germany, Scandinavia, Great Britain, France, Italy, and the Canary Islands. He died at Berlin, March 4, 1853. His chief works are—*Geognost. Beobachtungen auf Reisen durch Deutschland und Italien* (2 vols. Berl. 1802-9); *Reise durch Norwegen und Lappland* (2 vols. Berl. 1810); *Ueber den Jura in Deutschland* (Berl. 1839); besides several monographs on ammonites and other fossils, and a beautiful geological chart of Germany in 42 sheets (2d ed. 1832). B.'s collected works were published in 1870.

Buch'an, the N.E. district of the county of Aberdeen, lying between the Ythan and the Doveran. The chief towns in it

are Fraserburgh and Peterhead. Some portions of the coast are very precipitous, and almost five miles to the S. of Peterhead are the famous Bullers of B., an immense well in the granite margin of the sea, into which the sea rushes by a natural archway, and in storms dashes up the sides with violence. B. was once an earldom of the old Scotch family of the Comyns, and remains of several castles belonging to them, as well as Druid circles, and the old Abbey of Deer, are still pointed out. It has developed a variety of the Aberdeen dialect of English, possessing a very respectable body of popular literature, and interesting from a philological point of view.

Buchanan, George, one of the greatest scholars of the 16th c., was born at the farmhouse of Moss, on the banks of the Blane, near Killearn, Stirlingshire, in February 1506. His father, Thomas B., belonged to an ancient family, but died in the flower of his age. His maternal uncle, James Heriot, sent him to the University of Paris at the early age of fourteen, where he remained for two years. In 1523, he served in the army of the Regent Albany, and took part in an invasion of England. Next year B. entered St Andrew's University, where he took the degree of B.A. in 1525. Soon after, he again proceeded to Paris, joined the Scots College in 1527, and graduated M.A. in 1528. Some time after he became Professor in the College of St Barbe, and tutor to the Earl of Cassillis. B., who was essentially a *humanist*—i.e., a lover of the exquisite literature of antiquity—was probably at no period of his life a devout Catholic; but about this time he seems to have privately adopted the doctrines of the Reformation; and, on his second return to Scotland (1537), after an absence of ten years, he composed, while residing in Ayrshire with his pupil, Gilbert, Earl of Cassillis, the *Somnium*, a poetical satire which gave mortal offence to the Franciscans, against whom it was directed. A new Erasmus appeared to be let loose on these solemn impostors, and their rage was so alarming that B. seriously thought of escaping to France. James V. stepped to the rescue, gave him one of his illegitimate sons (afterwards the famous Regent Moray) to educate, and instigated him to write his second satire, *Franciscanus*, which provoked such a storm of hate among the priesthood, that the King was unable or afraid to protect him; and in 1539 B. was forced to seek safety abroad. Cardinal Beaton, it is said, wished to have him assassinated. The truth is, the *Franciscanus* is obscenely abusive. B. now spent many years in Paris, Bordeaux, and Coimbra in Portugal, engaged in teaching, suffering much from the priests, but by his learning securing honour and protection from the great. While a prisoner in a Portuguese monastery on a charge of heresy, he translated the Psalms of David into Latin verse (*Psalmorum Davidis Paraphrasis Poetica*), a splendid triumph of the classic muse, which he afterwards dedicated to Queen Mary in verses that deserve their fame. During this third residence on the Continent, B. also composed his Latin tragedies on Jephtha and the Baptist, translated into the same tongue the Medea and Alcestis of Euripides, and wrote numerous odes and other poems. Restored to liberty in 1552, he first went to England, then back to France, and finally, in 1560, returned to his native country, which he never again quitted. B.'s fame as a brilliant scholar and poet preceded him. Mary, who admired genius, appointed him her classical tutor; but his religious politics rendered it impossible for him to be her friend. In 1566 he was made Principal of St Leonard's College, St Andrews, and in the following year Moderator of the General Assembly—the only layman that ever held that office. His *Detectio Mariae Scotorum Reginae*, dedicated to Queen Elizabeth, is rather an ignoble performance for a leal Scot, and, if its grossly slanderous contents were not concealed in a dead language, would even now evoke indignation. In 1570, B. was appointed tutor to the young king, James VI., and forced him, under penalties duly exacted, to receive a considerable share of learning. To James, B. dedicated his *De Jure Regni apud Scotos*, through which blows the keen air of classic liberalism. The last years of his life were spent in the composition of his *Rerum Scoticarum Historia*, on which his fame as an author chiefly rests. He died September 28, 1582. B. has long been reckoned the most exquisite Latinist of modern times, not only on account of the Augustan purity of his style, but also for the vitality and strength of genius which he threw into the ancient mould. Through him Scotland won a distinct and independent place in the learned world of Europe, and his name still awakens

admiration at home and abroad. The best editions of B.'s works are Ruddiman's (2 vols. Edinb. 1715) and Burman's (2 vols. Leyden, 1725).

Buchanan, James, the fifteenth President of the United States, was born in Franklin county, Penn., April 22, 1791. His father came from Donegal, Ireland. B. graduated at Dickinson College, studied law, was admitted to the bar November 17, 1812, and obtained a lucrative practice in the legal profession. He commenced political life as a Federalist, but became a Democrat under President Jackson. Entering Congress in 1820, he was appointed Minister to Russia in 1831, returned to the United States Senate in 1833, and opposed the rising anti-slavery agitation. President Pierce sent him to the English court, and he returned to assume the Presidency in 1857. His administration was disturbed with the troubles of Kansas, the Fugitive Slave Law, the John Brown raid, and the Southern Secession. B. tried to avert the storm by a peaceable policy, but failed; and his long success ended in eclipse. He died June 1, 1868.

Buchanites, a strange sect which arose in the W. of Scotland in 1783. Its founder was Elizabeth or Elspeth Simpson, born in Banff, 1738, of Scottish Episcopal family. She married Robert Buchan in Glasgow, who was a Burgher Seceder. In 1779 she began to prophesy the end of the world, and soon left her husband. At Irvine she became acquainted, in the year 1782, with the Rev. Hugh White, minister of the Relief Church there, who adopted her views. In May 1784 the people mobbed her house, and drove 'Lucky' Buchan and her followers from town. White, his wife, and others, male and female, and their mother in the Lord, forty-six in all, marched through Ayrshire to Nithsdale, and rested in a barn at New Cample, between Thornhill and Closeburn, all dwelling together. They were led out to a hill top to be translated, but returned to the barn, where they indulged in promiscuous sexual intercourse, and committed infanticide. At length some left, but others remained faithful. These took a farm in Kirkcudbrightshire, and built a house in Crochetford, where the last died in 1846, having the bones of the prophetess interred with him. Elspeth herself died in 1791. See Joseph Train's *Buchanites from First to Last* (Edinb. 1846).

Buchan-Ness (the 'nose' or promontory of Buchan), the most easterly point in Scotland, a promontory in the N.E. of Aberdeenshire, 3 miles S. of Peterhead, and 25 N. of Aberdeen, lat. 57° 28' N., long. 1° 46' W. The Buchan Deeps is the name of a vast grove in the sea-bottom, 50 to 90 fathoms deep, and 25 miles broad, extending about seventy miles along the coast. On B.-N. stands a lighthouse 135 feet high.

Bucharest, or **Bukarest** (Wallach. *Bucuresti*, 'the city of delight'), the capital of Wallachia, and residence of the Princes of Roumania, on the Dembovitza, a feeder of the Danube, lies 36 miles W. of the shores of the Black Sea, and 244 N.N.W. of Constantinople. It is the see of a Greek archbishop, and has a university, founded in 1864, with a library of 26,000 vols., a museum, &c., and two public parks. B. is the centre of a great railway system from Russia and Poland by Galatz; from Constantinople by Varna and Rustchuk; from Austria by the Porte Orientale and Orsova on the Danube; from Hungary and Transylvania by Kronstadt on the Carpathians; and from the Black Sea by Kustendje and Tchernavoda in the Dobrudscha. B. is the chief resting-place between Pesh and Constantinople. It is 12 miles in circumference, ill-built, without sewers or water-works, and liable to severe attacks of typhus, diphtheria, and small-pox. A comprehensive Improvement Scheme planned by an English resident, Mr. J. W. Sheldon, was taken up by the Rumanian Government in 1878. B. carries on an active trade in grain, wool, cattle, timber, salt, wax, and honey, and is the entrepôt for the trade between Austria and the states that were formerly under Turkish sway. Pop. (1866) 141,754, many of whom are Germans. The treaty of B. between Russia and the Porte, signed May 28, 1812, gave to the former Bessarabia and part of Moldavia, and fixed the Pruth as the boundary between the two empires.

Buck, the term usually applied to the male Fallow Deer (q. v.), the female being named the 'doe.'

Buck-Bean, **Bog-Bean**, or **Marsh Trefoil** (*Menyanthes trifoliata*), a plant of the natural order *Gentianaceae*, found all over the colder parts of the northern hemisphere, and com-

mon in Britain. It grows in marshy places, and, with its beautiful flesh-coloured flowers with fringed petals, is one of the handsomest of British plants. From the bitter leaves is prepared an extract, which is tonic, astringent, and in large doses cathartic and emetic. Until lately it was admitted into the official pharmacopœia as a remedy in cases of dyspepsia and bowel complaints; at one time it was also used in intermittent fever. In some parts of Germany and Sweden it is sometimes used as a substitute for hops. The rhizome contains starch, which in Lapland is sometimes extracted and used as food.

Buckeye. See HORSE-CHESTNUT.

Buckhound, a variety of hound, so named from its being formerly much used in hunting the Buck (q. v.), or male fallow deer. The breed has of late years been much neglected. It resembles the Stag Hound (q. v.), but is of smaller size.

Buckingham, George Villiers, Duke of, favourite of James I. and Charles I., was the third son of Sir George Villiers, and born at his father's seat of Brookesley, Leicestershire, August 20, 1592. His handsome person attracted the attention of James I. shortly after the disgrace of his first favourite, Carr, and he soon became more than Carr had ever been. 'Steenie,' as James called him, and of whom the king was so fond that he used to loll on his neck and slobber his face with kisses, was in the course of two years elevated through all the ranks of the peerage, was made first Marquis and then Duke of B., and was appointed to innumerable offices, such as that of Lord Admiral of England, Master of the King's Bench Office, and Lord Warden of the Cinque Ports; and during the last years of the reign of James I., and the first of that of Charles I., was the sole director of the policy of Britain. Although the latest historian of this period, Mr S. R. Gardiner, has been able to show that B. was an abler man than was generally believed, his arrogance and luxury were intolerable. As a politician he was a failure, and he instilled into the mind of Charles I. notions which ruined him and his family. His ill-success (1623) in bringing about a marriage between the Infanta of Spain and Charles I., coupled with his ostentation and his lavish expenditure of the national treasures, roused the Commons, headed by Eliot and Pym, against him; he was impeached, and would have probably been brought to the scaffold, had not the king, who told B. he would die with him, dissolved Parliament. B. arranged the treaty of marriage between Charles and the Princess Henrietta Maria of France. He was disastrously beaten in an expedition for the relief of Rochelle in 1627, and when on the point of embarking on a second at Portsmouth, was stabbed to death by a discontented naval lieutenant, named John Felton, August 23, 1628. See S. R. Gardiner's *History of England under the Duke of Buckingham and Charles I.* (Lond. 1875).

Buckingham, George Villiers, Duke of, one of the wittiest, most versatile, and most profligate members of the court of Charles II., was the son of the preceding, and was born at Wallingford House, January 30, 1627. He studied at Cambridge, fought in the royal cause during the civil war, was present at the battles of Dunbar (1650) and Worcester (1651), and on venturing to make his appearance in London (1657) during the Protectorate of Cromwell, was thrown into prison, and only released on the abdication of Richard Cromwell. At the Restoration (1660), he recovered his estates, which had been confiscated, was made Master of the Horse, and by his wit and debauchery obtained a first place in the favour of Charles II. He was instrumental in bringing about the downfall of Clarendon, and formed one of the celebrated 'Cabal.' In 1666 he was disgraced for taking part in a conspiracy against the king, but was soon, by his address, restored to all his offices, and was made ambassador to France. He was engaged in the Popish plot, and assisted the Nonconformists in opposing the Test Act. On the death of Charles, B. retired to his mansion of Helmsley in Yorkshire. He died of a fever at Kirkby Moorside, April 16, 1688, and was buried in Westminster Abbey. With him became extinct the ducal branch of the old family of Villiers. The modern Dukes of Buckingham are Grenvilles. Besides being a politician and a debauchee, B. dabbled in chemistry, and wrote some poems and plays, of which last the best is *The Rhearsal*. B. is perhaps best known as being the original of *Zimri* in Dryden's *Absalom and Achitophel*.

Buckingham, James Silk, traveller and author, was born near Falmouth in 1786. After a chequered youth, he settled in Calcutta in 1816, and established the *Calcutta Daily Journal*. He secured the favour of the Marquis of Hastings, and his paper became successful. But on account of its severe censures of the Government it was at length confiscated, and B. returned to England. Here he started the *Athenæum*, and entered into various schemes and reforms. B. travelled extensively in Europe and America, and was unwearied in his efforts to give the world the benefit of his views; but he was something of a visionary, and his influence was transient. He sat in Parliament for Sheffield during 1832-37. B. died June 30, 1855.

Buckingham (Old Eng. *Buccingham*, 'the home or place of beech-trees'), the chief town of Buckinghamshire, on the Ouse, 61 miles N.W. of London by rail, with some manufactures of machinery, agricultural implements, manures, leather, straw-plait, and lace. It is almost encircled by the Ouse, which is here crossed by three bridges. The chief buildings are the parish church, built in 1780, and to which a fine Gothic chancel was added in 1866; a chantry chapel of the 13th c., used as a grammar-school since the reign of Edward VI., and repaired by Mr Gilbert Scott in 1588; and a fine Congregational church erected in 1857. B. is a very old place. It is mentioned in the *Chronicle* under date 918, and again in 1010. When Domesday Book was drawn up it was already a borough. The Earls of B., soon after the Norman conquest, built a castle here, and the family seat (Stowe) now lies about three miles to the N.W., being connected with the town by a fine avenue of trees which forms a favourite promenade. Pop. (1871) 7545. B. returns one member to Parliament.

Buckinghamshire, a county of England, in the basins of the Great Ouse and Thames, with an area of 738 sq. miles, or 467,009 acres, and a pop. (1871) of 175,879. It is one of the most fertile parts of the kingdom, has an undulating surface, is well wooded, and is watered by the Thames, Ouse, Ousel, Colne, and Thame. In the S. extend the Chiltern Hills, and in the N. there is much rising ground, while the centre is occupied by the rich vale of Aylesbury. The formation in the N. is Oolitic, and in the S. consists of greensand and chalk. Upward of two-thirds of the surface is cultivated, the chief crops being wheat, barley, oats, beans, and peas; and 1544 acres are occupied as orchards. There is much pasture, and in 1873 the number of cattle was 66,931; of horses, 15,923; of sheep, 288,341; of pigs, 43,301. The London market receives from B. a great quantity of wool, butter, cheese, and poultry. The towns Buckingham, Aylesbury, Marlow, and Wycombe are the chief seats in the county of the manufactures of paper, straw-plait, and thread-lace; and among the means of communication are the Great Western and the North-Western Railways, and the Grand Junction Canal. The county returns three members to Parliament, besides which five members are returned by the boroughs. In the reigns of Stephen and John, B. was the scene of the civil contest, though not of any event of special importance. It was also the headquarters for a time (1644) of the Royalist troops during the great struggle between Charles I. and his Parliament. Its antiquities are few, consisting chiefly of the remains of Nole Abbey, now partly converted into a farmhouse; Burnham, Missenden, and Medmenham Abbeys, and the churches of Stewkley, Hianslope, Chetwode (containing some of the finest stained glass in the kingdom), Olney, and Chesham Bois. There are few traces of the baronial castle of feudal times, but the still older remains of several British and Roman roads exist.

Buckland, William, D.D., F.R.S., a distinguished geologist, was born at Axminster, Devonshire, in 1784, and studied at Oxford, where in 1818 he became Reader of Geology. In 1822 he received the Copley medal for his discoveries in the Kirkdale Cave, was President of the British Association in 1832, was appointed Dean of Westminster in 1845, and died August 14, 1856. His chief works are *Reliquia Diluviana* (1823), *Geology and Mineralogy Considered with Reference to Natural Theology* (1836), one of the Bridgewater Treatises (q. v.), and *Annals of Philosophy*.

Buckland, Francis Trevelyan, son of the preceding, born December 17, 1826, was educated at Winchester and Oxford, where he graduated B.A. in 1848. Having studied medicine.

and held for some time the post of House-Surgeon in St George's Hospital, he was appointed Assistant-Surgeon to the 2d Life Guards in 1854, but retired in 1863. He has made natural history a special study, and among his principal contributions to the advance of this branch of science are his *Curiosities of Natural History* (new series, Lond. 1866), and *Fish-Hatching* (Lond. 1863). B. was appointed Inspector of Salmon Fisheries for England and Wales, and in this office has laboured successfully for the naturalisation of British salmon in colonial waters, especially in those of New Zealand and Australia.

Bucklandia, a fine tree, with the general aspect of a poplar, belonging to the natural order *Hamamelidaceæ*, or witch-hazels. It is a native of the Himalayas, but might probably be naturalised in Britain (Hooker). It is named in honour of Dr Buckland the geologist.

Buckle, Henry Thomas, historian, was born at Lee, in Kent, 24th November 1823. His life was spent in intense study, its only remarkable feature being that he attended no school or university, but owed much to his mother. In 1857 he produced the first volume of *The History of Civilisation in England*, in which he considers the physical influences, such as food, climate, &c., which he regards as controlling statical conditions of national character, and the intellectual development of man, which he regards as the source and measure of progress. These principles are then verified by a general survey of the political and intellectual history of England, France, Spain, and Scotland, the whole forming merely the introduction to a projected history of English civilisation in detail. B. is remarkably skilful and accurate in his tableaux of important facts, but his capacity for just or sage inference is marred by an intense fanaticism, probably engendered by his cloistered training and solitary study. B.'s main principle—i.e., of the subordination of the physical, moral, and political condition of society to the state of the speculative faculties—was first clearly stated by J. S. Mill in the *Logic of Moral Science* (*Logic*, vi.). B. died at Damascus, 29th May 1862. A large collection of posthumous papers, with a Memoir of B., was published by Miss Taylor. See also *Pilgrim Memories* (Lond. 1874), in which Mr Stuart Glennie reports his conversations in the East with B.

Buckle, a shield worn or buckled on the left arm. The Roman B. was oblong, padded inside with sheepskin and linen, covered outside with metal plate. In the middle ages it was round, oval, or square, and generally was made of hide or wicker-work, strengthened in various ways with iron.

Buckles, fastenings for belts, straps, boots, and other articles of attire, besides harness, trunks, and many kinds of leather work. The essential part of a buckle consists of a tongue which rests on the upper side of a frame, through which the strap to be fastened passes, the fastening being made by the point of the tongue passing through a pierced hole in the strap. B. were a very fashionable appendage of shoes during the last century, and they were frequently costly and elaborate in make. They began to be first generally used on shoes in the time of William III., but occasional allusion is made to the fashion much earlier. In *Pierce the Ploughman's Crede*, a work of the 14th c., the Franciscans are denounced for their pride in wearing buckled shoes. The caprices of fashion still occasionally induce the wearing of buckled shoes by ladies, and gentlemen wear B. as a part of court dress.

Buckskin, a strong twilled woollen fabric for trouserings. The web is usually about 27 inches wide, and when finished the pile or nap is so short that the texture is seen through it.

Buckstone, John Baldwin, a clever dramatist and popular comedian, was born near London in 1802, took to the stage at the age of nineteen, and so rapid was his success, that in two years he became chief 'low comedian' at the Adelphi Theatre, while he also wrote such pieces as *Luke the Labourer*. Since then his career as an actor and writer of plays has been very successful. He carefully studies all his parts, and is without a rival as a representative of some of the best characters in Shakespeare and Sheridan. For upwards of twenty years B. has been lessee of the Haymarket Theatre. He has written an enormous number of pieces for the stage, of which some, such as the *Green Bushes*, *Good for Nothing*, and the *Irish Lion*, are still very popular. B. is treasurer of the General Theatrical Fund.

Buckthorn (*Rhamnus*), a genus of shrubs or small trees belonging to the natural order *Rhamnaceæ* (q. v.), very generally distributed over the world. The common B. (*R. catharticus*) is found over Europe, Russian Asia, and N. America, is not abundant in England or Ireland, and rare in Scotland. The bluish-black nauseous berries are violently purgative, but are rarely used in medicine. The alder B. (*R. frangula*) is more frequent than the common B., but still rare in Scotland. Like the former species, it was at one time used in medicine, and has been recommended in intermittent fevers. In addition to a bitter extractive principle, it contains a volatile oil with hydrocyanic acid, and a yellow colouring matter called *Rhamnin*; the berries are violently purgative. The wood is used, under the mistaken name of 'dog wood,' for making the fine light charcoal used by the gunpowder makers. The bark, leaves, and berries are used for dyeing. The unripe fruits of Dyer's B. (*R. infectoria*), and probably other species also of the S. of Europe, yield a brilliant yellow dye. The berries and inner bark of *R. tinctorius* of Hungary are also used for dyeing yellow, while the 'Chinese green indigo,' used in Lyon for dyeing silk, is prepared from the bark of *R. utilis* and *R. chlorophorus*. *French berries*, *Avignon berries*, or *yellow berries*, are the fruits of *R. infectoria*, *R. saxatilis*, *R. amygdalina*, and *R. Clusi*, and are used by the dyers. The sea-B. (*Hippophaë rhamnoides*) is a plant of another order (*Eleagnaceæ*). (See SALLOW THORN.) The evergreen *Alaternus* of our shrubberies is a species of B. (*R. alaternus*), a native of the S. of Europe.

Bucku, or **Buchu**, a name given to several species of the genus *Barosma* (natural order *Rutaceæ*), natives of the Cape of Good Hope. The leaves of several of them are aromatic, stimulant, anti-spasmodic, and diuretic, and exercise a specific influence on the urinary organs. Their properties are owing to a bitter principle (*Diosmin* or *Barosmin*), and a scented volatile oil. The species used in the pharmacopœia are *B. betulina*, *B. crenulata*, and *B. serratifolia*. The Hottentots perfume themselves with the leaves of B.

Buckwheat (*Fagopyrum*), a genus of plants of the natural order *Fagopyraceæ*. The fruit differs from that of *Polygonum* by not being enveloped in the perianth. The common B. (*F. esculentum*), is a native of Asia, but is now naturalised in many parts of Europe, where it is cultivated for the sake of its mealy seeds, which, when ground, form a nutritious meal, inferior to wheat, yet superior in feeding qualities to rice. In the United States it is largely employed as human food, but in Britain it is only grown to a small extent for the purpose of feeding pheasants (*Treasury of Botany*). Tartarian B. (*F. Tartaricum*) is a very productive species, a native of Siberia, and well adapted for growing in cold localities. Among other species may be mentioned *F. emarginatum* of China, *F. cymosum* of Nepal, and the common blackbire (*F. convolvulus*), a frequent weed in our cornfields. The ground seeds are familiar in the form of black specks in oatmeal.



Buckwheat.

Bucolic (from Gr. *boukolos*, 'a herdsman'), an epithet applied to pastoral poetry, first by the Greeks and afterwards by the Latins.

Buczac, an old town in Austrian Galicia, on the Strina, a tributary of the Dniester, 30 miles E.N.E. of Stanislavov, noted as the place where the treaty of peace between the Poles and Turks in 1672 was signed. Pop. (1869) 9763.

Bud, the form in which the flower or leaves exist previous to being expanded. There are therefore flower-buds and leaf-buds, the former being generally easily distinguishable externally by being rounded, while the latter are more elongated. Buds are *terminal* and *lateral*; the former, produced at the extremities of the branches or stem, serve to carry on the plant upwards or outwards; the latter, produced on the sides of the stem or branches, prolong the plant laterally in the form of

branches and branchlets. The latter are also called *axillary*, from being produced in the axils of leaves, though in reality both kinds are. Buds vary considerably in their nature and size, and even in the depth of winter the buds will serve to distinguish various trees and shrubs. In some cases they are naked, in others covered with scales, or with a gummy, waxy, or resinous exudation, which serve to protect them from rain; or in another case the interior is lined with a non-conducting kind of down or wool, which protects the young leaves and other structures from cold during the winter season. Most palms and other monocotyledons produce no lateral buds, and accordingly, if the terminal B. which prolongs the stem upwards is destroyed, the plant dies. Sometimes, as in the case of the lilac, there are two opposite terminal buds. The way leaves are folded up in the B. is called *præfoliation* or *vernation*, just as that of the flower-buds is *æstivation*, and a variety of names are applied to express this, and also the relation the different leaves in the B. bear to each other. The *eyes* of potatoes are subterranean leaf-buds produced on the tuber. Leaves in temperate climates begin to be formed in the axils of the leaves as soon as the young branches on which they are borne have been properly developed, but may never go beyond the rudimentary stage. In addition, there will occasionally appear *adventitious* buds on indeterminate portions of the stem, at the extremity of a medullary ray, or at a place where an incision is made in the bark, and thereby a determination of sap directed to the place; they will even appear on leaves, as in *Bryophyllum* (q. v.).

Bu'da (probably the Magyar form of the Slavic *Budin*, a 'hut' or 'dwelling,' though it is also said to have been called after Buda, the brother of Attila) is the name of a Hungarian city on the right bank of the Danube, connected with Pesth on the opposite bank by a suspension bridge 1246 feet long. B. is built round the Schlossberg, from the centre of which rises the fortress (*Festung*), enclosing the royal palace, the Church of the Assumption, and the public offices. To the S. of this rises the Blocksberg, which is strongly fortified. B. has six suburbs, Raizenstadt or Tabán, Christenstadt, Landstrasse, Neustift, Wasserstadt, and Alt-Ofen (*Aquincum*), a market-town of 16,000 inhabitants, which since 1850 has been incorporated with B., and where are the dockyards and building-yards of the Danube Steam Navigation Company. In addition to the public buildings already mentioned, there are sixteen churches, five monasteries, the arsenal, theatre, &c. South of the Schlossberg is the Josephsberg, containing the grave of the Turkish dervish Gül Baba, with a mosque, to which pilgrims from Turkey and Persia still repair. A Gothic monument has been erected to the memory of General Hentzi, who fell in defence of the town in 1849. B. has numerous charitable institutions. At the foot of the Blocksberg are several hot sulphur-springs, Bruckbad, Raizenbad, Blocksbad; Kaiserbad to the N., and Königsbad, the Roman *Aque calidae superiores*, in Wasserstadt. From one of these, with a temperature of 117° F., is derived the German name of the town, *Ofen* (oven). B. has a trade in silk and leather, and has spinning-mills and machine-works. But the principal industry is the manufacture of wine, the vineyards in the neighbourhood producing the celebrated 'Ofenerwein,' to the amount of nearly 5,000,000 gallons annually. Pop. 53,998, of whom 46,979 are Roman Catholics and 2554 Jews.

B. was at first a Roman colony. The present town grew round the castle, built in 1247 by King Bela IV. During 300 years it suffered twenty sieges, and it was in the hands of the Turks from 1541 to 1686, in which year it was wrested from them by Karl of Lorraine. It again suffered severely in the Hungarian revolt of 1848-49.

Budé'sus, or **Bude'sus** (the Latinised form of the name *Budé*), the most learned Frenchman of his time, and the friend and rival of Erasmus, was born at Paris in 1467. His early education was defective, but at the age of twenty-three he conceived an ardent desire for study, and became profoundly versed in Greek, then almost unknown in France. B. was patronised by three monarchs in succession. Charles VIII. made him one of his secretaries; Louis XII. made him a member of a legation to Rome on the accession of Pope Julius II.; and it was to the influence of B. with François I., whom he accompanied on his travels, that the College of France owes its foundation. He had also charge of the royal library. He

died 23d August 1540. It is pretty clear that B. was of doubtful orthodoxy. He was wont to speak contemptuously of the doctors of the Sorbonne, and his widow and children went over to the Reformed faith. B.'s first works were translations from Greek into Latin, and it was not till 1514 that he laid the foundation of his great scholastic reputation by the publication at Paris of his treatise *De Asse et Partibus ejus*, which was followed in 1519 by his *Commentarii Lingua Græca*. He wrote fifty-six letters in Greek, which were translated into Latin in 1574. His collected works were published at Bâle in 1557, in 4 vols. fol. The fourth vol. contains his Greek commentaries. B. left in MS. a Greek-Latin lexicon, which was printed at Geneva in 1554, and again in 1562, and assisted Henry Stephens considerably in the compilation of his *Thesaurus*. See *Vie de Budé*, by Leroy (1541).

Buda'on, a town of British India, in the Rohilcund division of the N.W. Province, on a small tributary of the Ganges, 140 miles N.W. of Lucknow and 30 E. of Allepgurh. During the Mutiny the Europeans were forced to flee from B., which was, however, retaken by General Whitelock, 19th April 1858. Pop. (1872) 31,044. The *executive district* of B., which is level, and fertile in cotton, wheat, and barley, has an area of 1960 sq. miles, and a pop. (1872) of 934,348.

Buddh'ism (from the title of 'the Buddha,' the enlightened, assumed by its founder), a system of religion founded about 2500 years ago in India, and which, though it has now disappeared from the land of its birth, is professed by 455,000,000 of people, being more than 31 per cent. of the human race, in Cashmere, Nepaul, Thibet, Tartary, Mongolia, Japan, Siam, Burmah, and Ceylon. The reputed founder of the system figures in the legend of his life as the son of Sudhodana, king of Kapilawastu, a region in Central India at the foot of the mountains of Nepaul; and at his birth (the date usually assigned to which is 543 B.C., though later research places it sixty years after) is said to have received the name of Sidhartha. His father, we are told, belonged to the family of the Sakyas; hence, in allusion to the mode of life he adopted, he is sometimes called Sakya-mouni (Sansk. *muni*, 'a solitary'); and as the family belonged to 'a chain of the Gautamas, he is also called Gautama-Buddha. But the legends of his life, ancestry, and youthful career are not satisfactory even as legends, and the tendency of all later criticism (see M. Senart's *Études Bouddiques*, Par. 1875) is to destroy their value as historical documents. Many of the circumstances belonging to this period of his life are probably not legendary in the true sense at all, but parables or allegories, containing slight vestiges of real history. After B. left his father's palace, he became the pupil first of one Brahmin teacher, then of another; from them he learned to subdue the body and to discipline his mind by constant and well-directed meditation. During six years, spent partly in practices of great austerity, he failed to obtain the deliverance sought. After long meditation and ecstatic visions, however, he at last, by sheer force of thinking, arrived at the knowledge of the truth. He discovered the causes of all the changes inherent in human life, by which means the fear of them was entirely removed. He now desired to make known to mankind the valuable secret which he himself had learned, and having assumed the title of 'the Buddha' (the enlightened), he set out for Benares, the sacred city of the Brahmins, where he preached with great success. After travelling over the most of India, making many converts wherever he went, he died at the age of eighty, while sitting under a tree near Kusinagara.

The most striking feature in the history of B. is its power of proselytising, a power arising from the universal sympathy and brotherhood which it inculcated. By the middle of the 3d c. B.C.—i.e., in the time of Asoka—it was the established religion of the country. Missionaries were sent to other countries, who went upon a regular system of preaching, teaching, and disseminating the sacred doctrines. The first country converted was Ceylon. If we can still trust the *Mahawanso* (though its authority is now being seriously questioned), this conversion took place soon after Asoka's time. Ceylon has adhered to the Buddhist religion as a country down to the present day. From Ceylon it spread to Siam and Burmah. It reached China (according to the best authorities) about the 1st c. B.C., and before the close of the 1st c. A.D. was declared one of the state religions. Streams of pilgrims now flowed from China to India, which was regarded as

the Holy Land, while the religion spread largely into Central Asia. But in the early centuries of our era there was a revival of Brahminism in India, before which B. was forced to give way in that country. By the end of the 4th c. it was beginning to decline in the eastern part, although in the 7th c. it was still flourishing throughout the country. But from this time its decline must have been very rapid (though the 7th c. marks its triumph in Tibet), for in the 12th c. the last trace of it almost had disappeared from the country.

The Buddhist Holy Scriptures, containing the tenets of the system, the canon of which was said to have occupied the attention of a council held after the death of Buddha, and to have been fixed by a council in Asoka's time, and confirmed by a council in Cashmere in the beginning of our era, are called the Tripitika (three baskets), and are divided into three classes:—(1) The Sūtras, or discourses of the Buddha, not written down by himself, but by his chief followers immediately after his death; (2) The Vinaya, comprising all that has reference to morality or discipline; (3) Abhidharma, or metaphysics.

B. can only be called a religion at all in a very peculiar sense, since it is theoretically a pure atheism. It ignores the existence of a deity. Nevertheless the moral code of the system is one of the purest in the world. The basis of its ethics, which are so inextricably mixed up with the metaphysics that the two cannot be considered separately, is what the Buddha called the Four Verities:—(1) That pain exists, (2) that the cause of pain is attachment to existing objects, (3) that pain can be ended by Nirwana ('extinction,' but of what is still matter of dispute), (4) the way that leads to Nirwana. The way to Nirwana consists of eight parts—(1) Right faith (orthodoxy), (2) right judgment, (3) right language (truthfulness), (4) right purpose (uprightness), (5) right practice (the pursuit of a religious life), (6) right obedience (to all the precepts of the Buddhist law), (7) right memory, (8) right meditation. The supreme controlling power of the universe is Karma, that is, a chain of linked processes, which continually and necessarily recur in uniform regularity of sequence, by which all things are determined. The Buddhist believes that he has existed in many myriads of previous births (see TRANSMIGRATION), and may have passed through all possible states of beings, from the highest to the lowest (of men, and also of animals, and even of inanimate objects), and that he is in this life under the influence of all that he has ever done in all these previous existences. This is his Karma, the arbiter of his fate. Further, no one can tell in what state his next birth may be appointed by his Karma, for although he might live till the day of his death the most meritorious of men, and although there will certainly be a reward for all that is good, that reward may be long delayed, and there may be in his Karma some sin or crime committed ages ago but not yet expiated, and he may have to pay the penalty in the next life by being born as some degraded creature, or, if that be not enough, in one of the 136 Buddhist hells.

The two important points in this system are, that existence is an evil, and that the continuance of existence is unavoidable except by the attainment of Nirwana. Now it is teaching to mankind how this may be attained which is the prerogative and the special mission of a Buddha—a Buddha being not a deity in any sense of the term, but simply a human being of an exalted nature—which may be attained by any other human being by the practice of certain virtues. And a great part of the veneration paid to Gautama-Buddha is due to the supposition that, when he had it in his power to attain to Nirwana himself, he voluntarily endured indescribable afflictions in countless ages and successive births that he might attain to the Buddhahood, and thereby gain the power to free mankind from the misery of existence. This, then, is the basis on which all Buddhist morality is founded: what the Buddha taught mankind was how they might gain 'the other shore'; that other shore is Nirwana; so that, in other words, all virtue is to be practised, not for its own sake, but merely as a means to enable the person to escape from existence. At the same time it must not be overlooked that Nirwana is to a great extent the abstraction of a theological metaphysic; the hope of the masses is the bliss of heaven, which is believed to be the reward of virtue.

The eight parts of the way to Nirwana given above were developed into a set of practical moral and religious precepts. These depend on the different classes of sins. There are three sins of the body—murder, theft, adultery. Four of the speech—lying, slander, abuse, unprofitable conversation. Three of the

mind—covetousness, malice, scepticism. Five other evils to be avoided—drunkenness, gambling, idleness, improper associations, the frequenting of places of amusements. In connection with these there are five great commandments binding on all—not to kill, not to steal, not to lie, not to get drunk; next comes not to commit adultery. Five others for those entering on the direct pursuit of Nirwana—to abstain from unseasonable meals, from public spectacles (music, dancing, singing), from expensive dresses, ornaments, and perfumes, from having a large or soft bed, and from receiving gold or silver. For the regular recluses, ascetics, or monks, a number of observances of the severest character are prescribed—to wear only clothes made of rags sewed together with their own hands, to live only on alms, to take only one meal daily, and that before noon, to live in forests or deserts, approaching human dwellings only to get alms, to seek no shelter but trees, to rest only sitting at the root of a tree, and even sleep there without lying down, to meditate at night among the tombs on the vanity of all things.

The worship connected with the religion consists of adoration of the statues of the Buddha and of his relics, chief of which are his teeth. In theory, however, it may be distinguished in the popular mind from simple worship; the ritual is strictly commemorative; the worshipper's desire is to set before himself the 'example of him who trod the path that leads to deliverance.'

The great authority on B. is still Burnouf, *Introduction à l'Histoire du Bouddhisme* (Par. 1845). See also Wassilieff's *Buddhism, its Doctrine, History, and Literature*, and Professor Keru's *Dissertation on the Era of B. and the Asoka Inscriptions* (Amst. 1873). For a popular account, the reader may consult Eitel's *Lectures on B.*; Beal's *Catena of Buddhist Scriptures, from the Chinese* (1871); Spence Hardy's *Manual of B.*; *Legends and Theories of the Buddhists*; St. Hilaire's *Le Bouddha* (3d ed. 1862), and T. W. Rhys David's *Buddhism* (Lond. 1877). Childers, Max Müller, Lassen, Koeppen, &c., have written works on *Nirvana*, &c. MM. Senaāt, Feer, and Barth are the most recent and the best guides for a critical treatment of the legends of B.

Budd'ing, a mode of grafting in which a leaf-bud is used as a graft instead of a young shoot. See GRAFTING.

Budding, or **Gomma'tion**, in zoology, a name applied to the asexual process of reproduction, whereby new animals are produced by a process analogous to that of B. in plants. B. in animals may be *continuous* or *discontinuous*. In the former case (seen in *Hydra* or zoophytes, sea-mats, or *Polysua*, &c.), a complicated and connected animal colony, made up of numerous separate animals or zooids, is produced. In the latter case, buds are detached, and form the beginnings of new colonies, or live a separate and single existence. B. occurs in *Protozoa*, *Calenterata*, *Echinozoa*, in a few *Annulosa*, and in lower *Mollusca*.

Buddleia, a large genus of shrubs of the natural order *Scrophulariaceae*, containing about eighty species, two of which (*B. Neemda*, a beautiful plant, a native of India, and *B. globosa*, or Chili) are cultivated in our gardens.

Bude Burner and **Bude Light**. See BURNERS.

Bud'get (Fr. *bougette*, Ital. *bolgetta*), the name of a small sack or wallet, with its contents, and hence applied metaphorically to a miscellaneous store of things, as a B. of news. In its familiar sense it means the annual financial statement made by the Chancellor of Exchequer to the House of Commons in a committee of ways and means, embracing a general view of the public revenue and expenditure, an estimate of the probable expenditure of the ensuing year, and a declaration of what taxes it is intended to reduce or repeal, or what new ones it is found necessary to impose.

Budhan'uh, a town in the district of Mozuffernuggur, N.W. Province, British India, 20 miles N. of Delhi, in a fertile and woody country. Pop. (1872) 6750.

Budös or **Budösch Hegy**, a steep isolated mountain of the Carpathians, in the S.E. of Transylvania, situated on the boundary-line between the districts Csik and Haromszek, and rising to a height of 3005 feet. It is of volcanic origin, and has many sulphur-springs and caves containing sulphurous vapours.

Bud'weis (Bohem. *Budejovice*, 'the place of huts'), the capital of a circle of the same name in the extreme S. of Bohemia,

on the Moldau, 77 miles S. of Prague, and a station where the railway to Linz and Vienna diverges. It is partly fortified, contains a cathedral, and has an active transit trade. There are also manufactures of woollens, machinery, stoneware, chemicals, and lead-pencils. Near B. is the fine old *Schloss Frauenberg* (*Hluboká*), and also a spacious new Gothic castle, both the property of Prince Schwarzenberg. Pop. (1869) 17,413. The *district* of B. has an area of 1754 sq. miles, and a pop. (1869) of 240,790.

Buen Ayre, or **Bonaire**, one of the Curaçao Islands, in the Caribbean Sea, lat. 12° 20' N. and long. 68° 27' W. It is 20 miles long by 4 broad, has 3300 inhabitants, and exports cochineal. The group belongs to the Dutch.

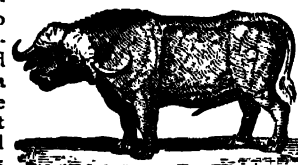
Buenos Ayres (Span. 'fine airs'), the capital of a province of the same name, seat of the Argentine government, and the great centre of trade for the whole republic. It lies on the right bank of the Plata estuary, 150 miles from the sea, is built in great part of wood, having granite-paved and regularly arranged streets. The chief public buildings are the cathedral, a university (founded 1821), a military college, a large market with shops under arched colonnades, the new Government offices, the custom-house, an exchange, several banks, and a fine theatre. A thorough scheme of drainage and of water-supply is being carried out (1875), the contract for which amounts to about £3,000,000. There are numerous tramways throughout the city. Owing to the shallowness of the river, sea-going vessels have to anchor within from 7 to 15 miles W. of B. A., and the cost of transport to the shore is occasionally greater than the freight from Europe. To obviate this, the Government projected (1874) an extensive series of docks, but little has yet been done beyond dredging the channel. The town is situated to command the overland Chili trade, and is the emporium for an immense tract of pastoral country. There are thirteen regular lines of steamers sailing between B. A. and Europe, touching at the ports of Brazil and Monte Video. The exports are chiefly wool, hides, animal oil, horns, hair, cured and salted meat, bones, and ostrich feathers. Of the imports the most important are coal, iron, wood, agricultural implements, and various manufactured goods. In 1872 the import of wines, beer, and spirits amounted in value to £1,850,000, and that of woven fabrics to £2,600,000, while the total value of imports in 1873 was £11,886,861, and of exports £6,886,506. There was also received (1872) 38,000,000 feet of timber, mostly from Canada, and 92,000 tons of coals. B. A. is the terminal centre of four railway lines, and has communication with the various towns of the republic by means (1875) of 4500 miles of telegraph-wire. A submarine cable is being laid (1876) between B. A. and Brazil, to connect the former directly with Europe. Pop. (1869) 177,787, of whom many are English, French, and Italian. A fort was founded here by Pedro de Mendoza in 1535, but was destroyed by the Indians four years later, and not rebuilt until 1580. It thereafter prospered, was made a bishopric in 1620, and became the capital of the Spanish viceroyalty of La Plata in 1776. In 1806, it was twice taken by the English, and as often recovered by the Spaniards. Another effort to take the town in 1807 entirely failed; and General Whitelock, commander of the besieging force, on his return to England was in consequence cashiered for incapacity. B. A. was several times the scene of contest during the Argentine civil wars, which terminated in the peace of 1860. It was visited by a severe yellow-fever epidemic in 1871. The *province* of B. A. is the most productive and populous in the whole republic, and has an area of 63,000 sq. miles, and a pop. (1869) of 495,107, of whom 151,241 are immigrants, some 70 per cent. of the whole being engaged in grazing and agriculture. The country is very flat, and the climate is generally healthy, with a tendency to sultriness. Some 400 miles of railway (1876) traverse the province, radiating from the capital in four different lines. A few industries, as the preserving of meat, and the manufacture of cloth, soap, and leather, have been introduced of late years. See Wilcocke, *History of B.* (Lond. 1806); Balcarce, *B. A.* (Par. 1857).

Buffalo, a city and port of entry in the state of New York, at the mouth of B. Creek, on Lake Erie, near the head of Niagara river. It is 22 miles S.S.E. of Niagara Falls, and 293 N.W. of New York. The city extends from some low ground to a high plateau, and the streets are spacious, clean,

and well built. Its most notable buildings, besides several of its seventy churches, are the State Arsenal, the U.S. Custom-house, the City Hall, and four markets. B. is well situated for receiving the trade of the lakes and the great West. It is a great railway centre, and the Erie Canal (364 miles) connects it with the Hudson. The receipts of grain have immensely increased of late years, in consequence of the erection, since 1842, of some thirty immense storing warehouses, called *elevators*. Total imports and exports, about 100,000,000 dols. B. has extensive spirit distilleries, oil-refineries, and flour-mills, while its smelting furnaces and numerous engine and nail works are among the largest in the States. Its harbour is accessible to vessels drawing 14 feet of water, and there is now a pier 1500 feet long, which supports a lighthouse. The accumulation of ice at the end of the lake impedes navigation during winter. B. publishes some twenty-eight newspapers. It was founded as a military frontier station in 1801, and was destroyed by a party of British and Indians in 1814. It was rebuilt in 1814, incorporated as a city in 1832, and has now (1875) a pop. of 134,238.

Buffalo (*Bos* or *Bubalus bubalis*), a genus of *Bovide* or oxen, represented typically by the common B., which exceeds the common ox in size. Its original habitat appears to have been India, but it has extended its distribution, being now found in Persia, Arabia, Egypt, S. Africa, Greece, Italy, and other parts of S. Europe. It is employed in India, Italy, and elsewhere as a beast of burden.

The forehead is convex, and bears two horns, which are of black colour, and turned outwards and slightly backwards, and have a prominent ridge in front. The hair is coarse and scanty, except on the cheeks and throat, and a 'dewlap' exists. The tail is tufted. The back is elevated between the shoulders, so as to give the animal a somewhat 'humped' aspect. These creatures are gregarious in habits, and live chiefly in marshy districts. They never appear to attain a great degree of domestication. The flesh is coarse, the milk, however, being esteemed. The *Ghee*, a butter-like compound in repute among the natives of India, is made from B.'s milk. The Cape B. (*Bos* or *Bubalus Caffer*), another species, inhabits S. E. Africa, and extends as far N. as Guinea. It exists in numerous herds. The horns are very large, their flattened bases forming a bony plate covering the top of the head. The coat is of a brown colour, the horns being coloured black. In length, this species averages eight feet, and in height at the shoulders about five feet. These animals are very ferocious, especially when irritated or pursued. They are hunted for the sake of their flesh and hides; the latter being manufactured into shields by the Caffres, and into other articles. The American B. or bison (*Bison Americanus*) is described in the article **BISON**. The huge Arnee of India (q. v.) is presumed to be a variety of the B.



Buffalo.

Buffalo-ra, a small town in the province of Pavia, N. Italy, on the Ticino, 25 miles N.N.W. of Pavia, historically interesting as the scene (June 4, 1859) of a fierce conflict between the French under Macmahon and the Austrians, in which the former were victorious. Pop. 1257.

Buffet is a French term applied to any article of furniture which serves the purpose of a cupboard or sideboard. It has given rise to a curious corruption in English. See **BEEF-EATER**.

Buff Leather is prepared from ox-hides by the process of oiling, without the use of any tanning material. It forms a soft, pliant material with a porous texture, but it is at the same time strong and durable. The hides to be prepared as B. L. are limed, unhaird, and scraped, as in the ordinary tanning process, after which it is handed over to the currier, who works a quantity of cod-oil into it in the trough of a fulling-mill. After the oil has been absorbed, and the skins operated on have a dry-like appearance, they are again sprinkled with oil and the stocking repeated, which process goes on for several days, decreasing however in frequency of oilings. The skins, after the oiling is

complete, are hung in a drying chamber heated by steam-pipes, in which they undergo a slight fermentation, which induces a more thorough incorporation of the oil. The excess of oil is removed by treating with a weak potash-lye, washing out, drying, stretching, and smoothing with pumice. The buff colour is given by dipping in an infusion of oak-bark. B. L. is largely used for military belts, house shoes, and other purposes.

Buffon, George Louis Leclerc, Comte de, a famous French naturalist and physicist of the 18th c., was born September 7, 1707, at Montbard, in Burgundy. He studied law at the college of the Jesuit fathers in Dijon, but soon turned his attention to science. Amongst his earliest literary productions are translations of Newton's *Fluxions* and of Hales's *Vegetable Statics*. It is as a naturalist that B. is chiefly celebrated, although his studies also included observations on the inorganic portion of natural objects. He contributed to the French Academy of Sciences in 1733 original memoirs on zoological subjects, and was appointed in 1739 curator or keeper of the Royal Garden and Museum. He worked successfully to establish systems of arrangement and classification in zoological science; and his large book, *Histoire Naturelle* (15 vols. Par. 1749-67) constitutes a memorable epoch in natural history literature, as being among the first attempts on a large scale to remodel the insufficient and inaccurate systems of zoology that had hitherto prevailed. B. was created Comte de B. by Louis XV., whose favour, with that of Louis XVI., he enjoyed. He died in Paris, April 16, 1788. B.'s literary style is marred by certain grandiose mannerisms. As an observer he was acute and quick to discern, but lacked patience and perseverance. His works have been translated into almost all the languages of Europe. The two best editions are those of Richard (Par. 1824 *et seq.*) and Farné (Par. 1837-39). See Flourens's *Buffon, Histoire de sa Vie et de ses Ouvrages*; and two fine works 'crowned' by the French Academy—Michaut's *Éloge de B.* (Par. 1878), and Hémon's *Éloge de B.* (Par. 1878), both of which writers availed themselves of the invaluable material contained in the two volumes of B.'s *Correspondance*, first published in 1860 under the editorship of M. Nadauld de B., a great-grandnephew of the illustrious naturalist.

Buffoon (Fr. *buffon*, Ital. *buffone*), a common jester or mountebank, probably so called on account of his horseplay and vulgar pleasantries; the most likely origin of the name being the *buffa* of the middle age Latin, from *buffare*, 'to puff the cheeks.' The Italian *buffo* is the name given to a humorous actor, and a burlesque play is called a *commedia buffa*, and a comic opera an *opera buffa* (Fr. *opera bouffe*). In Italian opera there is a *buffo cantante*, with a good voice—usually bass, who is distinct from the *buffo comico*, or regular scaramouch.

Bug, the Western, is the largest tributary of the Vistula, rises in Galicia, forms a part of the W. boundary of Russia, and joins the Vistula 18 miles N.W. of Warsaw, after a course of 450 miles. The Eastern B., the ancient *Hypanis*, rises near the confines of Volhynia, and joins the Dnieper 25 miles below Nicolaiev. Both are in part navigable.

Bug, a name popularly applied to insects belonging to the order *Hemiptera*, including the *Geocoridae* or Land Bugs (e.g., bed-B., &c.), and the *Hydrocorae* or Water Bugs (e.g., Boat-fly, q. v., &c.). These insects are more properly included in the *Heteropterous* group of the order *Hemiptera*, or those possessing the front wings horny in part, with the *rostrum* or *beak* springing from the front of the head. The mouth in all is specially adapted for piercing the skin of animals or plants, and contains pointed bristle-like organs representing the jaws. The house or bed-B. (*Cimex lectularius*) is wingless, possesses a flat, oval body, and averages $\frac{1}{2}$ to $\frac{3}{4}$ of an inch in length. The colour is reddish, and the mouth is suctorial in form. These insects exhale a disagreeable odour, especially when touched or crushed. The young of the B. resemble the parent save in size, and are active throughout their metamorphosis or development, which is of the incomplete or *hemimetabolic* kind. The B. was believed to have been first brought to England in American timber after the Great Fire of London in 1666; but this idea is erroneous. These insects infest furniture and the crevices of walls by day, but are active during the night, and then suck the blood of man or other animals. The best *preventive* is thorough cleanliness, whilst corrosive sublimate solution, turpentine, and other remedies, are said to be destructive to these insects.

Other species of bugs infest the lower vertebrate animals, and some inhabit and suck plant-juices. Several tropical species attain a large size, and are proportionately annoying in their blood-sucking habits. The field-bugs of Britain also form typical examples of these insects; a well-known species of the latter forms being *Acanthosoma grisea*, which is noted for its attention to its young.

Bugeaud, de la Piconnerie, Thomas Robert, Marshal of France, was born at Limoges, in France, October 15, 1784. Although he entered the army in 1804 as a private, he rose rapidly, and was a colonel before the fall of Napoleon. After the revolution of 1830, B., having turned Liberal, became a favourite of Louis Philippe, but was unpopular with the Paris populace from his declaring against universal suffrage and the freedom of the press. Appointed Governor-General of Algeria, he gained, August 14, 1844, a great victory over the Emperor of Morocco at Isly, and was created Duc d'Isly; but the cruelty of some of his proceedings made his name detested throughout Europe. B. stuck to the last by Louis Philippe, but under the Presidency of Louis Napoleon was made general of the army of the Alps. He died of cholera at Paris, June 9, 1849.

Bu'genhagen, Johann (*Pomeranus*), a German Protestant theologian, born at Wollin, Pomerania, 24th June 1485, and studied at Griefswald. In 1503 he became rector of the school of Treptow, but was led by the perusal of Luther's *De Captivitate Babylonica* to repair to Wittenberg, and take an active part in the Reformation. There he was appointed Professor of Theology in 1522, and then pastor of the town church. B. proved an admirable organiser of the new churches, and for this purpose was called in 1537 to Denmark by Christiern III. He performed his task so satisfactorily that the king offered him the rich bishopric of Schleswig, which B. refused. He died 20th April 1558. B. assisted Luther in his translation of the Bible, and wrote several treatises, among which are *Historia Christi* and *Explicatio Psalmorum*, published at Frankfurt in 1614, which evince great exegetical ability. He also turned Luther's High-Dutch Bible into Low Dutch (Lüb. 1533) for the use of the Lower Saxons. See Engelken, *Joh. B., Pomm.* (Berl. 1817); and Zietz, *Joh. B.* (Leips. 1829; 2d ed. 1834).

Bugle, a wind instrument, similar in principle to the trumpet, cornet, &c. Its special peculiarity is that the tube increases in diameter very gradually through a great part of its length, while in the trumpet the tube is nearly parallel throughout, swelling suddenly at the bell. The form of the tube modifies the quality (or *klang*) of the notes produced, making them (in this case) more mellow and round, and less brilliant and piercing than in the trumpet.

Bugle (*Ajuga*), a genus of the natural order *Labiata*, spread over Europe, Asia, Africa, and Australia, but unknown in America. There are many species, of which three—*A. reptans* (the creeping B.), *A. Chamæpitys*, and *A. Genevensis* (*pyramidalis*)—are found in Britain. *A. Alpina* is found in the Alps. Most of the species of *Ajuga* have beautiful flowers.

Bugloss (*Lycopsis*), a genus of the natural order *Boraginaceæ*, though the name is also popularly applied to *Anchusa* or alkanet, &c. Only one small *L. arvensis* is found in Britain, but the name of *Viper's B.* is given to the genus *Echium*.

Buhl, or **Boule-Work**, surface ornament consisting of tortoiseshell inlaid with brass and white metals, employed in adorning furniture, and introduced into France during the reign of Louis XIV. by André Charles Boule. This costly style of decoration is yet occasionally adopted in workboxes and small toilette articles.

Buh'reach, or **Bharaich**, the capital of an executive district in the province of Oude, British India, on the Sarju, 65 miles N.E. of Lucknow. It has considerable trade in rice, sugar, cotton, indigo, and tobacco. In its vicinity is the tomb of the Moslem saint Selar. Pop. (1869) 18,889. The district of B. has an area of 2710 square miles; pop. (1872) 774,640.

Buhr'stone, or **Burrstone**, a hard, granular, siliceous sandstone, used for making millstones for grinding meal and flour, and for powdering cements, manures, &c. They are composed of almost pure silica, with only sufficient lime to bind

them together, and they form very durable grinding surfaces. The buhrstones mostly used in this country come from the Tertiary deposits of the Paris basin (Seine et Marne), and are of a porous texture, with a light-yellow colour. They obtain their name from the 'burr' or grooved surface, which has either to be picked or cut with diamond into them to give sharp grinding edges. For making millstones, blocks of B. have to be carefully jointed together, and backed with a thick coating of concrete. Buhrstones are also imported from S. America.

Building. The erection of a house, or other such structure, requires generally the co-operation of several professions. The design of the whole work is prepared by an architect, who also makes out detail drawings and a complete specification. The actual execution of the work is undertaken by a builder, who is paid either a fixed sum on account of the whole contract, or from a schedule of prices agreed on at the commencement for each particular kind of work. A 'clerk of the works' is appointed to superintend their construction in the interest of the owner and architect. The architect himself is commonly paid by a commission on the value of the work. In the large structures, in which much iron is employed (railway stations for example), now so frequently erected, the civil engineer has to a great extent taken the place of the architect, and the builder has been superseded by the contractor. The result is not always quite satisfactory from an æsthetic point of view; but, regarded as pieces of engineering, nothing could be much finer than some of the immense iron roofs for stations erected within the last few years. In parts of London (and elsewhere) a practice has grown up among builders of erecting houses 'on speculation'—becoming their own architects and clerks of works. The result has been disastrous as regards the public, the houses being too frequently carelessly put up, badly drained, and altogether inferior.

Building Act, Metropolis. See METROPOLIS LOCAL MANAGEMENT ACT.

Building Company. Of recent years an immense number of companies have been constituted, chiefly under the Companies' Act of 1862 and the Amendment Act of 1867, with the professed object of facilitating the building and purchase of houses by the public. These companies have to building societies a relationship analogous to that which a Mutual Assurance Life Society has to a Life Assurance Company. In the societies, profit or loss on the business is divided among the members. In the companies it is divided among shareholders. The B. C. takes money on deposit, for which it pays a somewhat higher rate than can generally be had on money available at call. The depositors have the security of the subscribed capital of the company, and of the real property on which their funds are lent. Loans are repaid by instalments, the rate of interest paid being, while money is at an ordinary value, about $5\frac{1}{2}$ per cent. In the difference between the rate charged to borrowers and the rate paid to depositors lies the profit to the company. Borrowers have, of course, to pay the legal expense of getting their loan, and the company has, of course, to pay its expense of management.

These companies undoubtedly have useful functions; but it is to be kept in view that to some extent they give an artificial stimulus to building houses. Money taken on deposit at 3 or 4 per cent—which is a tempting rate to depositors—must be employed so as at least not to cause loss to the company; and if public requirement for house accommodation does not keep pace with the amount of capital thus necessarily employed in housebuilding, the result must be at least a diminution in the numbers and profits of building companies.

Building (Benefit) Societies. These are benefit societies established for the purpose of raising funds to enable the members to build or purchase dwelling-houses, or other real or leasehold estate by means of loans, each member being entitled to a loan to the value of his share. The debt is secured by mortgage to the society, until the whole of it with interest, and fines or other dues, has been paid off. Formerly, under the Act of Parliament, shares were not allowed to exceed £150 each, the corresponding monthly subscription for which was not to be more than twenty shillings. But under the Act of 1874, which came into operation on 2d November of that year, this restriction was done away with, the contribution and ultimate value of a member's share being now at his own discretion. There are two

classes of B. (B.) S.—the terminating and the permanent. By the Act of 1874, a terminating society is declared to be one which, by its rules, is to end at a fixed date. A permanent society is declared to be one which has by its rules no fixed date for ending. A society receiving a certificate under the Act from the registrar is a body corporate. It is empowered to receive money at interest from members or others, but the deposits are not to exceed two-thirds of the amount for which the society holds security from its members. If any society constituted under the Act receives loans on deposit in excess of the prescribed limit, the directors or committee of management are liable for the excess. The society may invest funds not immediately required in real securities and in the public funds. Judicial winding up may be voluntary, or on a petition of three-fourths of the members present at a general meeting. See BENEFIT or FRIENDLY SOCIETIES.

Building Leases. In English law, these are *demises* of land for long periods—usually ninety-nine years or more—for the erection of houses or other tenements. They are granted under authority of the Court of Chancery. In Scotland, the term is limited to a lease for building purposes of land entailed. By 13 and 14 Vict., c. 48, special provisions are made in favour of the building of schools and churches, with playground and burying-ground attached, on entailed estates.

Building Stones. Many varieties of stone, of both igneous and sedimentary origin, are used in construction, but those most universally employed and generally suitable are the sandstones or freestones, limestones, and marbles. A good building stone resists disintegration or peeling on exposure to the weather; it should be easily worked, uniform in texture and colour, and free from joints or cracks. Sandstones or freestones suitable for building purposes occur in most of the older geological formations, beginning with the old red sandstone, which in Scotland, besides furnishing the celebrated Caithness and Forfarshire flagstones, yields excellent common B. S. of various colours, the prevailing tint, however, being red. The building sandstones of finest texture and colour are yielded by the strata of the carboniferous formation, out of which the towns of Edinburgh and Glasgow are chiefly built. The stone of Craigleith quarry, in the vicinity of Edinburgh, stood second on the list of the commissioners who inquired into the question of stones suitable for the new Houses of Parliament. Limestones are not nearly so largely used as a building material, but the magnesian limestone of the Anston quarries in Yorkshire was the stone selected for the Houses of Parliament—an unfortunate selection, for although it has an excellent colour, and is practically imperishable in a pure atmosphere, it weathers rapidly in the air of London. The Bath oolite is very largely quarried in Somersetshire and Wiltshire, and is a fine, compact, pure-coloured building stone. The oolite limestone of Caen is a beautiful material, and much prized for ornamental structures. Many marbles capable of receiving a good polish are found in Ireland, Derbyshire, Devonshire, &c., and used for constructive purposes. The Purbeck marble was formerly in great repute for internal work. Granite is only used as a building material in localities where it is abundant and less hard stones scarce. The town of Aberdeen is built of it, and in a polished state it is very frequently employed in decorative structures. Granite is also very extensively employed in the construction of harbours and seawalls, and as paving blocks. The basalts, porphyries, and greenstones are little used in house-building, but they are employed in pavements, and some porphyries polish into very beautiful ornamental stones.

Bujalan'ce, a walled city in the province of Cordova, Spain, 25 miles E. of Cordova, has manufactures of glass and pottery, and exports agricultural produce. Pop. 9000.

Bukkur, a town in the province of Punjab, British India, 190 miles W. of Lahore. It lies in a fertile district near the E. bank of the Indus, and has some trade and a pop. of 5000. There is also a fortress of this name in Scinde, on an island in the Indus, between Roree on the left bank and Sukkur on the right.

Bukowina, an Austrian crown-land, lies S.E. of Galicia, and has an area of 4035 sq. miles, and a pop. (1869) of 513,404, of whom 56,000 are Roman Catholics, 11,400 Protestants, and 48,000 Jews. It lies among the Carpathians, and is mostly

highland, rising from E. to W. in a series of terraces. The chief river is the Pruth, both banks of which are well cultivated, yielding especially heavy crops of maize. There is much mining of rock-salt (at Kaczika), iron, and copper. The chief town is Czernowitz, and the principal industries are mining and wood-cutting. Formerly a part of Transylvania, it was conquered (1482) by Stephan V., Prince of Moldau, and came under Turkish rule in 1529. It next became a subdivision of Austrian Galicia. In the Russo-Turkish war of 1769, it was occupied by the Russians; in 1775 it was ceded to Austria; in 1786 it was united to Galicia, and in 1849 erected into an independent crown-land.

Bulak, a town of Egypt, on the right bank of the Nile, in the neighbourhood of Cairo, of which it is the port. It is connected by railways with Suez and Alexandria, and has a custom-house, a bazaar, a central college of dervishes, a medical school, a military hospital, an engineering college, and some silk and cotton manufactures. It has also a Government printing-house, the first ever introduced into the East by a native ruler. This was founded by Mehemet Ali in 1829-30, and still flourishes, the Khedive taking a deep interest in its prosperity. Books are issued from it in Arabic, Turkish, Persian, French, and English. There are at present (1875) 300 persons employed in it and in the paper-mills adjoining, which supply paper for the press. Pop. of B. about 20,000.

Bulb. This is usually described as 'a permanently abbreviated stem, mostly shorter than broad, and clothed with scales which are imperfect thickened leaves, or more commonly the thickened and persistent basis of leaves.' New buds are formed in the axils of the scales, which develop at the expense of the parent B., and finally destroy it.

Small bulbs, or *bulbets*, are produced in the axils of the leaves of the *Lilium bulbiferum* and other plants, which fall off, take root and develop into plants exactly the counterpart of that which produced them, showing their identity and also that of bulbs with buds, though these are usually described as underground stems. Many bulbs are used as food (e.g., those of the onion, garlic, shallot, scallion, chive, the *Camassia* (q. v.) of N.W. America, while others are cultivated for the sake of the beautiful flowers which the plants produce.

Bul'bul, the American name for the Nightingale (q. v.), but also applied to the Insectorial birds scientifically known as the *Pycnonotus hamorrhous* and *P. jocosus*, belonging to the *Dentirostral* section of the order. These birds occur in the E. Indies, and are readily domesticated. The bill is short and compressed, the ridge of the upper mandible being curved. The gape or mouth is provided with bristles. The nostrils are placed in a groove. The food consists of food and insects.

Bulgaria, formerly a vilayet of Turkey in Europe, now an autonomous state tributary to the Sultan, bounded N. by the Danube, E. by the Black Sea, S. by the Balkan range and W. by Servia. Area, upwards of 33,000 sq. miles; pop. (1864) 1,995,243, the majority of whom are Slavs. It is flat and fertile in the N., comprising the southern half of the great plain of the Danube. The district at the mouth of the Danube known as the *Dobruddsch*, hitherto forming part of B., is (since July 1878) annexed to Rumania. The Balkan Mountains attain on the southern frontier an elevation of 6000 feet. They are traversed by several defiles, some of which, such as the Schipka Pass, have been made historically memorable by the recent Russo-Turkish war. From the Balkans the country slopes more or less abruptly to the banks of the Danube, and a smaller plain slopes E. to the Black Sea. Corn, flax, hemp, and tobacco are grown; a considerable quantity of wine is produced, and roses are extensively cultivated for the manufacture of perfume. Timber cut in the defiles is floated down the rivers of B. to the Danube, and large herds of cattle are reared, as are also horses, sheep, and goats, and swine. The manufactures, which are coarse and for home consumption, are trifling, and the imports consist of manufactured goods, spices, coffee, sugar, &c. The capital is Rustchuk (q. v.), and the principal seaport is Varna (q. v.). The Bulgarians, a race of Ugrian Tartars from the banks of the Volga, repeatedly crossed the Danube after the 4th c., and made destructive raids on the Byzantine Empire; but it was not till 680 that they finally subdued the old Moesian population, and established a powerful

kingdom in the present B. They soon, however, became so blended with the conquered Slavs that nothing distinctive remained but the name of the victorious race. In the 9th c. they even adopted the Slavic language. After a long struggle the Bulgarians were themselves forced to acknowledge the authority of the Byzantine emperors in 1018. In 1391 the country was conquered by the Turks. The Bulgarians suffered much from the harsh rule of their masters, and more than once broke out into partial revolt without success. In 1876 an insurrection, probably fomented by Russian intrigues, but certainly provoked by cruel and rapacious oppressions, was quelled by a series of the most horrible outrages ever perpetrated by human beings. The ultimate result was a war between Russia and Turkey (1877), in which the latter power was completely prostrated, and the autonomy of B. secured by the victory of the Russian arms, was definitively declared by the Treaty of Berlin, July 1878. In religion the Bulgarians are Christians of the Greek Church. See Vretos, *La Bulgarie, Ancienne et Moderne* (St. Petersburg. 1852), and Gossip, *Turkey and Russia: Their History, Races, and Wars* (T. C. Jack, Edinb. 1878).

Bul'garin, Thaddeus, a Russian journalist and romance writer, born in Lithuania, 1789. He served for seven years in the army of his native country, and afterwards in that of France till the overthrow of Napoleon in 1814, when he exchanged the sword for the pen, publishing his first efforts in verse at Warsaw in the Polish language. He afterwards settled in St Petersburg, and founded (1825) the *Northern Bee*, the tales and humorous sketches in which soon procured for B. a wide reputation. His best romances are *The Russian Gil Blas* (4 vols. St Petersburg. 1829); *Peter Ivanovitch* and *The False Demetrius* (St Petersburg. 1830), all of which have been translated into French. B. is perhaps still better known by his *Russia in its Historical, Statistical, Geographical, and Literary Aspect* (Ger. transl. Riga, 1839-41), and by his *Memoirs* (6 vols. St Petersburg. 1846-50; Ger. 1858-61). He died at Dorpat, September 13, 1859.

Bulkheads, in a ship, are transverse partitions which serve the double purpose of strengthening the ship transversely, and of affording additional security in the event of leakage occurring through injury to the hull. In order that the latter object may be gained, each bulkhead must be made watertight, and any doors in it must be arranged so that they can be closed watertight. In this way the ship is divided into compartments, and in the event of leakage occurring in any one of them, it can be separated from the others, the buoyancy of which may enable the ship still to float in safety.

Bull (Lat. *bullus*), any object swelling up, and thus becoming round—(1) the capsule of the seal appended to letters from the papal chancery; (2) the seal itself; (3) the instrument or decree itself. Bulls are written on parchment, to which a leaden seal is affixed—by a grey hempen cord if the B. is touching matters of justice, but by a yellow or red silken band when it touches matters of grace. The publication of a B. is termed *fulmination*; the seal bears on the obverse side the arms of the Pope, and on the reverse, his name and the year of his pontificate; and in the interim between the election and consecration of a pope, the seal bears no arms. Bulls are designated by the first words of their text, as the B. *Unigenitus*; *De Salute Animarum*; *In Censu Domini*, &c. The Golden B. of the Emperor Karl IV., of which the Latin original is still preserved at Frankfort, was so called from the golden seal appended to it. A collection of papal bulls is a *bullarium*. A diminutive of B. is the Fr. *bulletin* (It. *bul'tino*), applied to the brief despatches of generals; such as the announcements of victories or defeats, to authenticated reports on the health of important public personages, &c.



Wild Bull.

Bull, the name given to the males of the *Bovide* or oxen, which are distinguished from the female animals by their usually larger size and more ferocious disposition. The bulls of some varieties of oxen possess horns, whilst the females are hornless.

Bull. See EXCHANGE.

Bull, George, D.D., a distinguished theologian and prelate, born at Wells, Gloucestershire, 25th March 1634, educated at Twiston and Oxford, and ordained at the age of twenty-one. Having obtained various preferments, and the degree of D.D., he was made Bishop of St Davids in 1705. He died February 17, 1710. He published a number of theological works, of which the most important were *Harmonia Apostolica*, *Defensio Fidei Nicenæ*, against Arians, Socinians, Tritheists, and Sabellians, and *Judicium Ecclesiæ Catholica*, for which he was thanked by Bossuet and various others of the French clergy. As a prelate, B. was distinguished for his candour and toleration.

Bull, Ole Bornemann, a great Norwegian violinist, was born at Bergen, 5th February 1810, and studied for a short time (1828) at the University of Christiania, from which he is said to have been expelled for becoming leader of an orchestra at one of the theatres. In 1829 he went to Cassel to study the violin under Spohr, but was so coldly received that he took to law at Göttingen University. He was subsequently at Minden, from whence, in consequence of a duel, he fled to Paris (1831), where he lived for a time in direst misery. An unsuccessful attempt to drown himself in the Seine is the turning-point in his life. Thereafter he acquired the patronage of a lady of rank, and rapidly rose to fame as a violinist. His playing was original and strange—in the style of Paganini—and his performances were received most enthusiastically throughout Europe and America. In the latter country he retired from public life with a fortune (1869), and married a German lady in Wisconsin in 1870. B. died in 1875.

Bulla, a genus of *Gasteropodous* mollusca, the shells of which, from their light texture, are familiarly known as 'Bubble-shells.' The shell is rounded, and may be partly or wholly external. Its lip is sharp. The animal possesses a large head, which is bilobed posteriorly; the side lobes are of large size, and the hind-lobe covers the spire of the shell. The foot is also large and four-sided. The 'Water-Drop,' or *B. hydatidis*, is a familiar species of the British coasts, and *B. ampulla*, *B. oblonga*, *B. aspersa*, and *B. nebulosa*, are species as noted by various observers. They abound chiefly in the tropic seas. The genus forms the type of the family *Bullada*, which in turn is included in the *Opisthobranchiate* section of the *Gasteropoda* (q. v.). See also MOLLUSCA.

Bullace (*Prunus insititia*), a variety of the common sloe or blackthorn (*P. communis*, q. v.), rare in Scotland, but common in the English hedgerows, banks, and coppices. Its fruit, after having been mellowed by frosts, though acrid, is not unpleasant, and is in some parts of the country a favourite fruit for tarts.

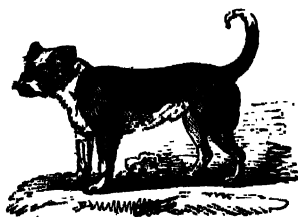
Bullas, a town in the province of Murcia, Spain, 26 miles W.N.W. of Murcia, has manufactures of linen, hemp, and earthenware. Pop. 5145.

Bull-Baiting, a once favourite sport in England with all ranks. The bull was fastened by a rope to a stake and then attacked by bulldogs, one by one, trained to *pin* him—i.e., to seize him by the nose, though they sometimes tried to get under his belly. Much of the excitement of the spectators consisted in

observing the success of the bull in receiving his assailants on his horns and tossing them in the air. It was in 1835 put down by Act of Parliament, but not without much opposition, as in some localities it had assumed the form of an annual festival.

Bulldog (*Canis familiaris*, variety *lanarius*). A breed of dogs distinguished by the massive, strong, and broad

fore-quarters, by the short stout neck, and by the thinner hind-quarters. The head in the well-bred B. is round, the skull high, the eye of moderate size, and the forehead depressed between the eyes. The ears should be semi-erect and small, and placed



Bulldog.

well on the top of the head; the muzzle short, abrupt, and fleshy; the back short and well arched, whilst the stem should be of moderate length. This breed has been mingled with many others, in order to impart that dogged determination and courage for which the bulldogs are famous; but the breed, of itself, is not now propagated with the same interest as in former years, when 'bull-baiting' was so greatly in vogue. Not naturally fierce or vindictive, these dogs are made so from the treatment to which they are subjected. The breed is believed by some naturalists to represent a cross between the mastiff and hound, or as a mere variety of mastiff. The general colour is reddish, or white and brindled. The *bull-terrier* is a smaller variety of this breed, probably intermingled with the terrier.

Bull'er.—1. A large river in the province of Nelson, in the middle island of New Zealand. It rises in Lake Howick, in S. lat. 41° 30', and E. long. 172° 40'. It flows first N., then N.W., then S.W., and finally W. during the greater part of its course, falling into the Pacific at the town of Westport (see NELSON), after a course of 100 miles. It is a deep and rapid stream, and is liable to sudden and heavy floods.—2. A district in the same province, forming the basin of the river B. It is very mountainous, and the arable land is confined to the valleys. It is one of the principal gold-fields of New Zealand, and the largest nuggets obtained in the colony have been found in this district. The chief centres of population are Westport, Lyell, and Reefton. At the two last, rich reefs of auriferous quartz are worked. Silver, lead, copper, and iron have also been found in the district. Coal of the best quality abounds, but is only beginning to be worked.

Bullet (Fr. *boulet*, dimin. of *boule*; Lat. *bulleta*, any round object, a bubble, &c.), a projectile made of lead, and having a spherical, ovoid, or conical form, fired from small arms. With the introduction of the Brunswick rifle into the British army the B. was altered from a spherical to a conical form, and at the same time increased in weight. The conical B. of the Minié rifle, adopted in 1851, had an improvement, in so far as in its base there was a conical chamber into which was fitted an iron cup, which by the explosive force of the gunpowder was driven forward, expanding the B., and causing it to take the grooves of the rifle. In the modified Minié B. of 1853 the iron cup was replaced by a boxwood plug, and the weight was reduced from 670 to 530 grains; the projectile was 1.095 inch in length, and .56 inch in diameter. A B. the same as the last was at first used in the Enfield rifle, but afterwards to allow for windage the diameter was reduced by $\frac{1}{16}$ of an inch. A later change was effected, on the score of as great efficiency and less expense, in the substitution of a baked clay plug for the boxwood one. The B. of the Snider breechloader is 1.065 inch in length, .573 inch in diameter, and 480 grains in weight, while the projectile for the Martini-Henry rifle has the same weight, but is longer and narrower on account of the smallness of the bore, .45. Perfectly pure lead is employed in making bullets, the action of the compressing machine used in the process being one of the many interesting sights at Woolwich arsenal. Bullets are lubricated with pure beeswax.

Bulletin. See BULL.

Bullet-Tree, or **Bully-Tree**, a species of the genus *Mimosa* (natural order *Sapotacea*, q. v.), a native of Guiana, the heavy, dark-grained wood, and the delicious fruit of which (about the size of a cherry) are valued. By some authors the B.-T. is looked upon as *Achras sapota*, a member of the same order. *Swartzia tomentosa*, a native of Guiana, is also sometimes called the B.-T. and the wood beefwood. The bastard B. is *Bumelia netusa*; the black B., *B. ingens*; and the Jamaica B., *Lucuma mammosa*.

Bullfight, a brutal sport of great antiquity. It was popular among the Greeks and Romans, though the spread of Christianity finally brought it into antagonism with the moral sense of the empire. Bishops denounced and popes forbade it, but it appears to have resistless charms for Spaniards of all classes, and is still witnessed with enthusiasm both in the Old World and the New. From April to November is the season in Madrid for the degrading show, and there is at least one a week. It takes place

in the *Plaza de Toros*, a sort of circus which can accommodate from 10,000 to 12,000 spectators. The first who take part in the sport are the mounted *Picadores*, fantastically arrayed like old Spanish knights, and armed with lances. They await the first charge of the bull, and if it proves cowardly, stab it to death. If it fights, the *Chufos* on foot, in bright-coloured cloaks, and decked with gay ribbons, stick into its neck their barbed darts. When the bull is thus infuriated, the *Matador*, the principal performer, with a naked sword in his right hand, and in his left the *muleta*, a small stick with a piece of scarlet cloth attached to it, at which the bull rushes wildly, steps forward to finish the business. If successful, he kills the bull by running his sword in between the left shoulder and the shoulder-blade of the animal. His triumph is greeted with an applause which is not refused to the bull when it happens to be the victor. The combat—if it can be so termed—lasts generally about twenty minutes, but is often repeated eight or ten times in the course of a day's entertainment.

Bullfinch (*Pyrrhula*), a genus of Insectorial birds belonging to the *Conirostres*, and distinguished, as a genus, by the large size of the head, the stoutness of the bill, the convex ridge of the upper mandible, the rounded wings, and short tarsi. The common B. (*P. vulgaris*) inhabits Britain, Europe, and Asia. The male possesses the top of the head, wings, and tail of a black colour; the back is grey, the rump white, and the under parts reddish. The tail is short and even. The back of the female is brownish, and the lower parts yellowish-brown. These birds feed chiefly upon



Bullfinch.

seeds, and are very destructive in gardens. They inhabit woody districts. The eggs are four or five in number, and are coloured pale-blue, spotted with purple and brown. The natural song of the B. consists of a few plaintive notes, but these birds may be taught to whistle tunes, and thus become favourite pets, fetching high prices when well trained. The piping bullfinches are mostly trained in Germany. These birds appear to be singularly liable to disease, and to die suddenly. The Pinefinch (q. v.), or Pine Grosbeak (*P.* or *Pinicola enucleator*), is an allied species occurring in Europe, but chiefly in America, and inhabiting the Arctic regions in summer.

Bullfrog (*Rana pipiens*), a species of *Ranidae*, or frogs, so named from the hoarseness or loudness of its croak. These frogs occur in N. America, and are most plentiful in the southern parts of that continent. The B. averages from 8 to 12 inches in length, the body being coloured olive-green spotted with black. It inhabits marshy places, and swims well. These frogs make a loud, croaking noise, particularly in the evening, their voice being audible at a distance of 40 or 50 yards. The food consists of worms, insects, and molluscs; but these animals are also credited with seizing young ducks as they swim, and with swallowing their prey whole.

Bullhead (*Cottus*), a genus of Teleostean fishes, belonging to the section *Acanthopterygii*, and included in the *Triglada* or Gurnard family. The B. (*C. gobio*), or 'Miller's thumb,' as it is popularly called, is a fresh-water fish inhabiting some British rivers, and also occurring in Europe and Asia. The head, as in the family generally, is wide and flattened, the mouth being large and provided with numerous small



Bullhead.

teeth. The pre-operculum possesses a single spine, and the opercula or gill-covers end in a flattened point. The skin is smooth, and destitute of scales, and is coloured dark-brown

above, greyish-white on the sides, and white below. The fin rays are marked white and dark-brown, and the fins with dark-brown spots. The eyes are yellow, and the pupils are coloured dark-blue. The average length of this fish is four or five inches. It hides under stones and in crevices, into which it pushes its way by means of its strong flattened head. Other species of the B. genus (*Cottus*) are marine in habits, and three familiar forms inhabiting the sea are the *C. bubalis*, *C. scorpius*, and *C. quadricornis*. The armed B. (*Aspidophorus cataphractus*), or Pogge (q. v.), belongs to a different genus, and is a marine form. The body in the latter is enclosed in ganoid plates, the body being eight-angled, and bearing recurved spines on the snout.

Bullinger, Heinrich, was born at Bremgarten, Switzerland, July 18, 1504. He was a follower of Zwingli, by whom he had been converted to Protestantism, and on the death of Zwingli, 1531, succeeded him as pastor at Zürich, where he died, after a laborious and useful life, September 17, 1575. B. had a leading share in the composition of the second Helvetic Confession, and was also the chief medium of communication between the Reformers in Switzerland and in England. Of his numerous writings, the most important is his *Reformationgeschichte*, edited by Hottinger and Vögel (3 vols. Zür. 1838-46). See Hess, *Leben B.'s* (Zür. 1828), and Pestalozzi, *B.'s Leben und Schriften* (1859).

Bullion means usually uncoined gold or silver. But with regard to the currency of a country, the word is commonly used to denote coined as well as uncoined gold and silver.

If we suppose that the quantity of B. in commercial circulation in the world was to become fixed, while commerce continued to expand, then B. would become daily dearer, that is, its value relative to the produce of human industry would gradually become greater. On the other hand, a great increase in the earth's yield, or crop, of gold will lower its value relative to the produce of human industry.

Now the increase in the produce of human industry is continually going on, as is the exchange of that produce by trade; but, on the other hand, the earth's yield of gold outstripping the consumption (in plate, tear and wear, &c.), the quantity of gold in circulation is continually on the increase also. We have thus two counteracting forces. In one sense, the mastery tends to go to the one side; in another sense, it tends to go to the other. Hence a great deal of confusion exists in the public mind as to whether the cost of living grows greater or not. The immense increase in the quantity of B. in circulation in England, and its continued increase, will be apparent to any one who will look at any old accounts or records. Even in a village the days are gone of 'passing rich on forty pounds a year.' There are probably in England a hundred men worth £500 a year for one that there was a century ago. The social power, therefore, of £500 a year, or other given income, is correspondingly diminished. This fact is owing to accumulation of gold in the world. But £500 a year will command much that the purse of Fortunatus could not have commanded a century ago. This is too plain to require illustration, and on the whole we believe that the given income will command more luxury now than then.

At the same time, it is social power, and not the luxury, that men chiefly regard; and this being so, there can be no doubt that the tide of B. is ever running against the fixed income, which to some is a serious fact. It is also important in questions connected with the national expenditure, and payment of the national debt. From the fact that, owing to causes stated, there is a tide always running in favour of the borrower and against the lender, it follows that the weight of a national debt is continually diminishing, even though it remains nominally the same.

In the eight years 1858-65, the total importation of gold into England was £219,166,344, and the total exportation was £195,759,150, showing an excess of importation of £23,407,194. See BALANCE OF TRADE. Consult *Fenn's Compendium of English and Foreign Funds*.

Bull Run, or **Bull's Run**, a stream in Virginia, U.S., on the banks of which the Confederates gained two well-known victories during the civil war, the first under Generals Beauregard and Johnston, July 16-19, 1861, and the second under Generals Lee, Longstreet, and 'Stonewall' Jackson, August 30, 1863.

Bull's Eye, in architecture, a glass lens to concentrate the light of a given centre upon an object; in nautical language, it is a small pulley with a rope spliced round the outer edge, and another sliding through a hole in the centre; in rifle-shooting, it is the mark in the centre of the circle on the target.

Bull- Trout, or **Grey Trout** (*Salmo Eriox*), a species of Teleostean fishes, included in the *Salmonida* or Salmon family, found in the sea, but also inhabiting fresh-water rivers at spawning time, such as the Tweed, in which it is very well-known. This form differs from the salmon (*S. salar*) in possessing a thicker head, neck, and tail; the body being in general of a less elegant shape than in the latter form. In old fishes the tail is rounded, the central fin rays becoming larger than the other rays; whilst in the young forms the tail-fin is nearly square. The scales are smaller than those of the salmon, and the male B.-trouts at the spawning-season are coloured brown or reddish-brown, the females being of a light or silvery-grey colour. As in the salmon, only a few teeth exist in the vomer, or centre of the palate. The flesh of the B.-T. is less delicate than that of the salmon. The Danube salmon (*Salmo Hucho*), or 'Hucho,' sometimes also receives the name of 'B.-T.' The latter may attain a weight of from 30 to 50 or more pounds; the B.-T. averaging about 15 lbs. in weight, but attaining in some cases a much greater size.

Bülow, Friedrich Wilhelm von, one of the heroes of the German war of liberation, was born at the family seat of Falkenberg, in the Altmark, 16th February 1755. In 1769 he joined the army, served under Blücher and L'Estocq in the French wars of 1793-95 and 1806-7, and was made lieutenant-general on the eve of the war of 1813. He stormed Halle (May 2), and rescued Berlin by his victory of Luckau (June 4) over Marshal Oudinot, whom, along with Marshal Ney, he again defeated at Grossbeeren. As a reward, he was made a knight of the newly-instituted order of the Iron Cross. B., by forced marches, arrived first at the gates of Leipzig, and contributed much to the final defeat of the French. In 1814 he drove the French from Holland and Belgium, then took part in the campaign of the Allies, and finally captured Montmartre. For these services the King of Prussia raised him to the rank of general of infantry, and conferred on him an estate worth £20,000, with the title of *Graf von Dennewitz*. His last action was at Waterloo, where he led the column that came first to Wellington's assistance. He died at Königsberg, 25th February 1816. B. was thoroughly skilled in the theory and practice of war, and is said never to have lost a battle himself or to have fought on the losing side. He was devoted to the fine arts, especially to music, and composed several motetts and a mass, and set the 51st and 100th Psalms to music. See *General Graf B. von Dennewitz in den Feldzügen 1813 und 1814* (Leips. 1843), and *Varnhagen von Ense's Leben* (Berl. 1854).

Bülow, Hans Guido von, the greatest, with perhaps one exception, of living pianists. He was born at Dresden in 1830, but did not show any aptitude or liking for music until after recovery from a long illness which he had as a child. Although intended for the law, he fortunately received early musical instruction, and as a young man embraced heartily the ideas (political as well as musical) of the Romantic school. His first hearing of Wagner's *Lohengrin* (under Liszt, at Weimar), in 1850, decided him to leave law and take to music as his profession. Since that time he has been one of the foremost in the great movement with which the name of Wagner is more intimately associated. Two of Wagner's operas—*Tristan and Isolde* (in 1865) and *Die Meistersinger* (in 1868)—were brought out under his baton, for he is as great a conductor as performer. B.'s memory is of astonishing power; he plays invariably without music before him, and on one occasion actually conducted *Die Meistersinger*, which occupies over four hours in performance, by heart. His compositions, which are not very numerous, are not known in this country, as he does not play them himself.

Bulrampur, or **Balrampur**, a town in the executive district of Gonda, province of Oude, British India, on the Raptée, 90 miles N.E. of Lucknow. It lies on the great Tibetan route, and has considerable trade. Pop. (1869) 14,026.

Bulrush, a popular name applied to reed-looking plants, such as *Typha* (q. v.), *Scirpus* (q. v.), particularly *S. lacustris*, &c., growing in marshes.

Bulrush of the Nile (*Papyrus antiquorum*), is famous on account of the soft cellular tissue in its stem having been used by the ancients for making paper, remarkable for its durability, and also for making ropes, mats, &c. The Sicilian *P. sicula* has also been used for making paper, and at the present day *P. corymbosus* is used in India for the manufacture of 'Indian matting.'

Bul'sar, or **Balsar**, a thriving seaport in the district of Surat, province of Bombay, British India, situated on the Gulf of Cambay, 44 miles S. of Surat. B. has gingham manufactures, and a considerable trade in grain and sugar. Pop. (1872) 11,765.

Bul'ti, **Baltistan**, or **Little Tibet**, a division in the N.W. of Cashmere, lies between the Himalayas on the S. and the Karakorum Mountains on the N., and is bounded W. by Ladakh or Middle Tibet, and E. by Astor. Area, 18,000 sq. miles; pop. some 500,000, mostly Mohammedans. It is a region of sublime scenery, where alternate beautiful valleys, silent wastes, mighty cataracts, and stupendous mountains rising in rugged precipices. The Upper Indus traverses the country, and in the S.W. are the Plains of Deosai, or the Devil's Plains, with an average height of some 16,000 feet. Skardo is the capital, and along the river there are many small towns and villages. B. was independent till 1840, when it was conquered by Cashmere.

Bulubgurh, or **Furreed'abad**, a walled town in the executive district of Delhi, province of the Punjab, British India, in a fertile country, 18 miles S. of Delhi. It is the residence of a native rajah, with whose authority the British do not interfere, and whose jaghire has an area of 190 sq. miles, and a pop. of 57,000. Pop. (1868) 7990.

Bulwark, in a ship, the continuation of the sides of the vessel above "level of the upper deck, so as to prevent objects from being thrown off the ship as she rolls, and to prevent the waves washing over her too freely under the same circumstances.

Bulwer-Lytton. See LYTTON, LORD.

Bul'wer, **Sir Henry Lytton, G.C.B.**, the eldest brother of Lord Lytton, was born in 1804. After serving in various British embassies, he sat in the House of Commons from 1830 to 1837. He then was sent as Secretary of Legation to Constantinople, where he negotiated an important commercial treaty. In 1843 he became Plenipotentiary at Madrid, where he acted firmly in a position made difficult by the dictatorial and reactionary policy of Narvaiz. After being stationed at Washington, he was in 1856 sent by Lord Palmerston (who had great confidence in him) to Bucharest, to investigate the question of the Danubian Principalities, and soon after succeeded Lord Stratford de Redcliffe as ambassador at the Porte. In 1871 he became Lord Dalling and B., and died at Naples, 23d May 1872. B. was successful both as a diplomatist and as a literary man. His *Life of Palmerston* (1870), containing a short autobiography, and his *Historical Characters* (1868), are his latest and best works. He has also written on France and Greece, and a *Life of Byron*.

Bum'boat, a boat allowed to visit ships lying outside a port or harbour, so as to supply the sailors and officers with fresh provisions, articles of clothing, &c. In British ports, B. traders are, as a rule, women.

Bum'kin, or **Boomkin** (Dutch *boom*, a tree or beam; and *kin*, Ger. *chen*, a diminutive), a short boom projecting over each bow of the ship, for the purpose of stretching the foresail farther to windward than the width of the deck at that part permits.

Bummalot'i. See BOMBAY DUCK.

Bunch'grass (*Elymus condensatus*), a valuable pasture grass found extensively over the open country to the W. of the Rocky Mountains, and remarkable for the great size to which it grows



Bulrush.

and its fattening properties. Cattle can be driven from the coast to the Rocky Mountains, living on nothing else than this grass, and will arrive fatter than when they started. The droves of cattle and horses which winter in that region live entirely upon it, and will scrape it up under the snow. It is accounted superior to hay. It grows in 'bunches,' hence the name. Dr Robert Brown introduced it into this country in 1866, but it is not yet grown to any extent, though it would be a valuable fodder grass, as well as a protection for game in poor, dry soils. Under cultivation it has attained the height of nearly 10 feet. See Gorrie, in the *Farmer*, March 4, 1868, December 19, 1869, and June 18, 1870.

Bun'delcund, or **Ban'dalkhand**, an agency of British India, in the E. of the great triangular plateau of Central India, is divided into twenty-four small native states, and four jaghirdars. Area, 22,351 sq. miles; pop. 2,394,800. It is traversed by the Puna mountain range, with deep ravines and isolated crags on its N.W. side, and is watered by the Betwah, Son, and Tonse, affluents of the Jumna and Ganges. There is much forest and jungle. In the N. it becomes an amphitheatre of sandstone precipices, forming part of the vast rugged country which stretches N. to the Jumna. B. is intersected in the E. by the East Indian Railway. The various states, of which the chief are Rewah, Urchal, Datia, and Samptar, yield to their rajahs a total yearly revenue of £2,016,222. In the W. are the peculiar Hindu tribes of Bandelas (hence *Bandalkhana*), and in Rewah in the E. are the Bhagelas (hence *Bhagalkhand*). See Malleeson, *Native States of India* (Lond. 1875).

Bun'di, an ancient Rajput state, in the Haroti plain, has an area of 2291 sq. miles, a pop. of 220,000, and a yearly revenue of £50,000. In consequence of its exposed position it formerly suffered much from Mahratta inroads, which led to its forming a treaty for protection with the British Government, 10th February 1818, since when it has paid a tribute of £4000. B. maintains a military force of 2700 foot, 700 horse, and 12 guns. Its capital, a town of the same name, 150 miles S.W. of Gwalior, is the residence of the rajah, and has a splendid palace. The present heir of the principality was born in April 1872.

Bung'alow, from a Bengalese word describing a house of one storey either thatched or tiled, has come to have a variety of meanings. It is applied to the private residences of Europeans in India. These usually consist of only one storey, and they are invariably surrounded with a verandah; but sometimes they are palatial residences of two storeys. B. may mean in this respect, a lodge, a villa, a mansion. The term is applied to officers' quarters, and even to the soldiers' barracks at military stations. Beside private and military, there are public bungalows, maintained by Government along trunk-roads, for the accommodation of travellers. These are known as *Dak* ('post') bungalows. They mark a stage or day's journey, and stand generally about 12 or 15 miles distant from each other.

Bun'gay, a well-built market-town in the county of Suffolk, England, on the river Waveney, 31 miles N.N.E. of Ipswich, and a station on a branch of the Great Eastern Railway. Some ruins of a Benedictine nunnery and of a castle believed to have been built by the old Earls of Norfolk are still extant. B. has considerable river-trade in corn, malt, coals, and lime. The grammar school has four scholarships at Emmanuel College, Cambridge. Pop. (1871) 3503.

Bu'nias, a genus of plants of the natural order *Crucifera*, natives of Central Europe, temperate Asia, and the Levant. *B. orientalis*, sometimes called 'hill-mustard,' was introduced into Britain about one hundred years ago for the sake of its leaves, which are used for feeding cattle, but its cultivation has never become general.

Bun'kapur, a town of India, in the executive district of Dharwar, province of Bombay, southern division, about 180 miles S.S.E. of Bombay. Pop. (1871) 6400.

Bunk'er Hill, or **Bunk'er's Hill**, at Charleston, near Boston, together with Breed's Hill, is celebrated as the scene of the first battle in the war of American independence, June 17, 1775. In this battle the colonists fled as soon as their entrenchments were reached, but they were undisciplined and in inferior numbers. A commemorative column was erected on Breed's Hill.

Bunk'um, properly **Buncombe**, is an American political term. When a person speaks merely to get votes or popularity, either by advocating impossible measures, or by flattering the prejudices of the people and plausibly advancing their sentiments as his own, he is said to be talking *B.* The application of the term arose in this way:—A member of Congress from B. county (N. Carolina), which was named after Colonel E. B., a Revolutionary soldier, was in the habit of making speeches wide of the mark on some occasions in Congress. He was remonstrated with, but replied that he was talking to *B.* In this way speeches and motions are often made for the mere purpose of securing or increasing local popularity. The word, and unhappily the *thing* also, has spread to other countries than the United States.

Bun'sen, **Christian Karl Josias, Freiherr von**, a highly distinguished German diplomatist and scholar, was born at Korbach, 25th August 1791. He was educated at Marburg, and under Heyne at Göttingen. To prosecute his study of German dialects he travelled in Holland, and learned Icelandic at Copenhagen from Finn Magnussen. In 1815 he passed several months with Niebuhr at Berlin. After studying Persian and Arabic at Paris under Sylvestre de Sacy, he went in 1816 to Rome, where he married an English lady. In 1818 he became secretary to Niebuhr, then Prussian ambassador at the papal court; and when Niebuhr left Rome, B. succeeded him. During his long residence at Rome, he prosecuted his studies with untiring ardour, devoting special attention to the Platonic philosophy, to biblical criticism, Church history, and liturgies, and making numerous contributions to the topographical and archaeological *Beschreibung der Stadt Rom* (3 vols. Stuttg. 1830-43). In 1841 he was sent to England to promote the establishment of an English-German bishopric at Jerusalem, and was shortly afterwards appointed Prussian ambassador in this country. This high post he held for seventeen years, and he discharged his important functions with conspicuous fidelity, acceptability, and success. Many young scholars, both German and English, such as Max Müller, Birch, Curzon, owed much to his encouragement and advice. At the time of the Crimean war his sympathies were too decidedly English for the then Russian proclivities at Berlin, and he retired from the service of his country. In 1857, at the special request of the Prussian King, he took part in the famous Evangelical Alliance held at Berlin, and was soon after called to the Prussian House of Lords. B. passed the remaining years of his active and noble career in the prosecution of his favourite studies, chiefly at Heidelberg, but in the spring of 1860 settled at Bonn, where he died, 28th November of the same year. His chief works are *Ägyptens Stelle in der Weltgeschichte* (5 vols. Gotha, 1844-45); *Die Verfassung der Kirche der Zukunft* (Hamb. 1845); *Ignatius von Antiochien und seine Zeit* (Hamb. 1847); *Die Drei Echten und die Vier Unchten Briefe des Ignatius* (Hamb. 1847); *Hippolytus and his Times* (first in Eng. 4 vols. Lond. 1851; Ger. 2 vols. Leips. 1852-53); *Christianity and Mankind* (also first in Eng. 7 vols. Lond. 1854); *Gott in der Geschichte* (3 vols. Leips. 1857-58); *Bibelwerk für die Gemeinde* (Leips. 1858). Depth of learning, acuteness and candour of judgment, catholicity of spirit, and a piety in which no superstition lurked, were the leading characteristics of this variously-gifted man. His literary talent, however, was not equal to his scholarship. It has also been said, probably with some truth, that he attempted too much and settled too little; but when all necessary abatements are made, his achievements constitute a massive monument of Teutonic industry and intellect. See *Memoir of Baron B.*, by his Widow (2d ed. Lond. 1869), and *His Life and Letters of Frances, Baroness B.* (Lond. 1878).

Of B.'s five sons, the first, **Heinrich von B.** (born 1818), has become a clergyman in the Church of England; and the second, **Ernst von B.** (born 1819), has won a place in literature by his work *The Hidden Wisdom of Christ and the Key of Knowledge* (Lond. 1864).

Bunsen, **Robert Wilhelm Eberard**, a world-famous chemist, born March 31, 1811, at Göttingen, in Hanover, where his father was a University professor. After studying natural and physical science in his native town, B. went in succession to the Universities of Paris, Berlin, and Vienna. Returning to Göttingen in 1833, he settled there as a lecturer in chemistry, but three years later was elected successor to Wöhler in the Chemistry chair of the Polytechnic Institute at Cassel. He

became professor at Marburg in 1838, at Breslau in 1851, and finally at Heidelberg in 1852. B.'s name is familiar to all students of chemistry in connection with his burner, which, combining simplicity of structure with perfect combustion, and the possibility of getting all degrees of heat under a certain limit, is an indispensable instrument in the laboratory. He has further extended the application of spectrum-analysis; and, among many other important discoveries, has found out an antidote for arsenic acid. As a lecturer he stands pre-eminent, attracting many foreign students to Heidelberg University. His chief works are *Eisenoxyd, ein Gegengift der Arsenigen Säure* (2d ed. 1837); *Ueber eine Volumetrische Methode von sehr Allgem. Anwendung* (1854); *Gasometrische Methoden* (1857); and *Chemische Analyse durch Spektralbeobachtung* (with Kirchhoff, 1861); besides which, he has printed numerous papers and memoirs in the scientific journals of Germany.

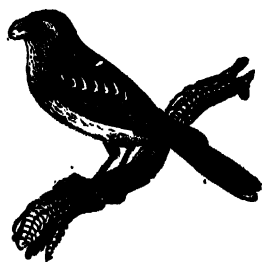
Bunt, a disease of wheat produced by parasitic fungi, which gives the ear the appearance of being *burnt*, hence, probably, the popular name of the disease. The species which produces it is *Tilletia caries*, which occupies the whole farinaceous portion of the grains of wheat.

It is now less common than formerly, owing to farmers using more care in the selection of clean seed, dressing the seed before sowing with salt, quicklime, Glauber's salts (sulphate of soda), blue vitriol, &c., or some other solution, which, while it destroys the spores of the fungus, does not injure the vitality of the seed. Arsenic and corrosive sublimate are even used, and washing with water is also useful. Wheat affected with B. is dark, but not absolutely unwholesome; the flour is said to be largely used in the manufacture of gingerbread.

Bunter Sandstein, the name applied to the series of strata forming the lower or older portions of the Triassic system of rocks. This name means 'variegated sandstone,' and has been applied to these beds by the German geologists from the typical development of the trias in that country. It forms the *Grès bigarré* of the French *savants*, and consists of a red and white sandstone, interstratified with red-coloured marls and bands of limestone, which latter may be of Oolitic or magnesian kind. The characteristic fossils of the B. S. consist of ferns, cycads, and conifers—especially plentiful near Strasburg—of a fish (*Acrodus Braunii*), and of reptiles such as *Trematosaurus*, *Nothosaurus*, *Placodus*, footprints of *Labyrinthodon*, &c. The B. S. is represented in Britain and elsewhere.

Buntine, or **Bunting**, a thin woollen fabric usually employed to make the flags and signals of ships.

Bunting (*Emberiza*), a genus of Insectorial birds allied to the finches, and forming the type of the sub-family *Emberizinae*.



Bunting.

The bill is acute and conical; the ridge of the upper mandible is nearly straight, and the margins are wavy or inflected. The palate possesses a knob or blunt process for crushing seeds, &c. The wings are of moderate length, and the hinder toe is longer than the inner digit. The buntings occur in both Old and New Worlds, and feed and build their nests on the ground or amid low grasses. The food consists of seeds and insects. The corn or common B. (*Emberiza miliaris*) is the common species, and is found throughout Europe and in Asia. These birds congregate in flocks in winter to feed on the seeds of the corn-fields. This species is larger than a sparrow, and is coloured brown above, with darker streaks; and light yellow, or whitish-brown, with dark-brown markings below. The tail is slightly forked or divided. The black-headed or red B. (*E. Shanichus*) is also a British and European species; the throat and head being black, and the nape and sides of the neck white. The black-throated B. (*E. Americana*) is a N. American species, which inhabits the Southern States permanently, and migrates northwards in summer. The snow B. (q. v.) (*E. nivalis*), sometimes included in a distinct genus as *Plectrophanes nivalis*, inhabits the Arctic regions during the breeding season,

and flies southwards in winter to the Saskatchewan river. The Cirl B. (*Emberiza cirlus*) inhabits S. Europe, N. Africa, and is rare in Britain. The head is of a dark or olive-green colour, streaked with black, and with yellow patches over the eyes and cheeks. The Ortolan (q. v.) (*E. hortulana*) and Yellow-hammer (q. v.) (*E. citrinella*) are also members of the B. genus. The Lapland B. (*Plectrophanes Lapponica*) is another form included in the same genus as the snow B., and inhabiting N. Europe and Siberia.

Bunt'ing, Jabez, a distinguished Wesleyan-Methodist minister, was born at Manchester, 1779. Known to the world as a philanthropist and eloquent preacher, his talents as an administrator contributed largely to the prosperity of his own sect. After having been four times President of the Conference, he retired from public life in 1857, and died June 1858.

Bunyan, John, was born at Elstow, near Bedford, in 1628. For some years he followed his father's trade, that of a travelling tinker. It was at one time believed that he had been very profligate in early life, from some strong self-accusatory passages in his writings; but, as the only vices which he really confesses to are swearing and Sabbath-breaking, the general opinion now is that his account of himself is mainly a religious over-statement. After a short service in the Parliamentary army, he married at the age of nineteen. His marriage was followed by his conversion, or religious 'awakening.' In 1655 he became a member of the Baptist congregation at Bedford, and, subsequently, its pastor. After the Restoration, he was convicted under the Act against Conventicles (1660), and thrown into Bedford Jail, where he remained for upwards of eleven years, supporting his family by making tagged laces, and writing *The Pilgrim's Progress*. Through the interposition of Dr Barlow, Bishop of Lincoln, he was released from prison (March 1672), becoming again pastor of the Bedford congregation. This position he held till his death, which took place, of fever, in London, 31st August 1688. B.'s *Pilgrim's Progress* is admittedly the first of allegories, and, even of its style, Macaulay says, 'There is no book in our literature on which we would so readily stake the fame of the old, unpolluted English language—no book which shows so well how rich that language is in its own proper wealth, and how little it has been improved by all that it has borrowed.' Of B.'s other works, the chief are his *Grace Abounding to the Chief of Sinners*, an autobiography, and the *Holy War*, another allegory, very inferior, however, to the *Pilgrim's Progress*. He is also the author of a vol. of verse, entitled *Divine Emblems*. The best edition of B.'s works, is Offer's (3 vols. Lond. 1853).—**Robert B.**, the last lineal descendant of John, died at Lincoln, November 27, 1855.

Bunzlau, a town of Prussia, province of Silesia, on the right bank of the Bober, 25 miles W. of Liegnitz. It is surrounded by walls and bastions, and has four suburbs. B. has an orphanage, a training school for teachers, a gymnasium (1862), and a large lunatic asylum (1863). In the market-place there is an obelisk in cast-iron, erected in memory of the Russian field-marshal Kutuzow, who died here, 28th April 1813. The town has manufactures of cottons, linens, tobacco, earthenware, and is also noted for its orchards. Pop. (1869) 8812. B. is the birth-place of the German poets Opitz and Tscherning.—**B. Jung** (Czech. *Mladá Boleslav*), a town of Bohemia, Austria, on the Iser, 32 miles N.E. of Prague, has important cotton manufactures. It is said to have been founded by King Boleslav in the 10th c. B. has several fine churches, and a handsome town-house. Pop. (1869) 8695, of whom many are Jews.

Bu'ol-Schau'enstein, an ancient and noble family, belonging originally to the Grisons, which for upwards of 200 years has furnished a succession of statesmen and soldiers to the Austrian service. The one who interests Englishmen most is **Karl Ferdinand, Count von B.**, who was born 17th May 1797, and who at an early age entered on a diplomatic career. After filling with prudence and tact several minor posts, he was sent as Austrian ambassador to Turin in 1844, to St Petersburg in 1848, and to London in 1851. Wherever he was sent, B. successfully upheld the interest and dignity of his country. In 1852 he was recalled to Vienna, and became foreign minister, in which office he displayed great ability, both during and after the Crimean war. At the commencement of the Italian campaign of 1859, B. resigned this office, owing, it is believed, to

the triumph of the policy of the war-party. He died at Vienna, October 28, 1865.

Buonarotti, Michael Angelo—the greatest name in art—was born at Chiusi, in Italy, March 6, 1475, and was descended on his mother's side from the noble Tuscan family of Canossa. He studied design in the school of Ghirlandaio of Florence, afterwards entered the school of sculpture established by Lorenzo de' Medici, at Florence, and there so distinguished himself by restoring the mutilated head of a laughing fawn, that he was invited to live and study in the Medici palace, where he remained three years. His statue, the 'Sleeping Cupid,' executed about 1494-95, was sent to Rome, exhibited there as an antique, and was accepted by the connoisseurs as genuine, and as superior to anything in contemporary art. Shortly afterwards the real history of the work became known, and the now famous sculptor was invited to Rome (1508), where he studied intensely, and executed the 'Mater Dolorosa,' a great group, placed in St Peter's. Returning to Florence, he executed for the ducal palace, to which Da Vinci painted a pendant, his great cartoon of the hostile Pisans surprising young Florentines while bathing in the Arno. This work, of which only a few fragments remain, was said by Benvenuto Cellini to have been B.'s *chef-d'œuvre*. It created a new era in the arts, by the marvellous power with which figures of men and horses, in every variety of attitude, were drawn, and by its grandeur and force. Pope Julius II. now became the patron of B., who designed for him a tomb of such grand proportions that the Pope resolved to have St Peter's rebuilt on the enlarged and noble plan of the existing building, that the monument should have a fitting shrine. Julius afterwards induced B. to paint the ceiling of the Sistine Chapel, which he did with his own hand in twenty months, filling the twelve compartments of the roof with splendid designs illustrating the history of the antediluvian world, and thus completing a work of imperishable renown, and one on which alone his fame as the greatest of artists, in the quality of grandeur of conception, might safely be based. His 'Last Judgment,' painted for the altar of the Sistine Chapel, and completed in 1541, was regarded as the greatest of his works. He now devoted himself to the reconstruction of St Peter's, which he converted from an incongruous structure into the noblest and most beautiful of Christian temples. After having thus raised himself to the first rank in art as painter, sculptor, and architect, and shown the versatility of his genius by the composition of some admirable verse, B. died at Rome, 17th February 1563, and was buried within the church of Santa Croce, at Florence. The fourth celebration of the centenary of the birth of B. was celebrated on the 24th September 1875, at Florence, where many distinguished representatives of Continental and British art assembled to honour the memory of the great sculptor with becoming rites and festivities. B.'s *Rime* have been repeatedly published, notably by his grandnephew and namesake (Flor. 1623), and by Guasti (Flor. 1863; Eng. by Symonds, 1878). See the *Lives* by Vasari (1550), Condivi (1553), Grimm (3d ed. 1868), and by Aurelio Gotti (2 vols. Flor. 1875). This last work contains a series of most interesting letters by the great artist, together with many curious documents of the B. family, collected and published for the first time.

Buoy, a floating body used as a mark for and by sailors for various objects, as to mark the position of the anchor, the existence of rocks or sandbanks, the direction of a navigable channel, &c. They are of various shapes, but are now very commonly made of hollow chambers of wrought-iron plates riveted together.

Buoy Dues. Ships entering certain ports are charged so much for what are called B. D.; this is sometimes a fraction per ton on the vessel, or so much per vessel, perhaps from a few pence to a few shillings.

Buprestis, a genus of *Coleoptera*, or beetles, belonging to the *Pentamerous* section of the order, and forming the type of the family *Buprestidae*. This family includes a large number of species, chiefly found in tropical regions, and remarkable for the brilliancy and metallic lustre of their colours. Several species are English or European. The *B. gigas* of Cayenne, or giant B., averages two inches in length, and has the thorax or chest of a cuprous colour mingled with brilliant green. Two large spots like burnished steel also ornament the chest. *B. fasciculata* averages an inch in length, and is of a golden-green colour, with

tufts of reddish and yellow iridescent hairs. These beetles are mostly diurnal in habits, and the lustrous *elytra*, or wing-covers, appear to be used by the natives of tropical regions as articles of decoration. *B. bicolor* is another familiar species. These beetles are liable to be attacked by other insects (*Cerceris*), such as wasps, the larvae of the latter feeding on the beetles.

Bura'no, an Italian lagoon-island and fishing-town on the Adriatic, 5 miles N.E. of Venice. The former is noted for its vegetables, and the latter for its lace. Pop. 5700.

Burbot (*Lota vulgaris*), a Teleostean fish, included in the Ling genus (*Lota*), and in the Cod family (*Gadida*). This fish occurs in fresh-water rivers and lakes of Europe and Asia, and is thus found in the Trent, Cam, and other English streams. The body is more elongated than in the ling, whence it has received the local name of 'Eelpout.' The first dorsal fin is short, the second greatly elongated, as also is the anal fin. The tail fin is oval, convex, or pointed. It possesses a single barbule on the lower jaw. The colour is light brown, the scales being small. The B. attains a weight of from 2 or 3 to 8 or even 12 lbs; and its flesh is said to be very palatable, although the fish has yet to become generally known as a food-fish. It feeds on worms, small fry, molluscs, &c. The liver yields an oil analogous to cod-liver oil.



Burbot.

Burckhardt, John Lewis, an intrepid and very observant traveller, was born at Lausanne, Switzerland, November 24, 1784. Coming to London in 1806, he offered the African Association his services in 1808 to explore the interior of Africa. Having studied Arabic for a time at Cambridge, he sailed for Aleppo in the spring of 1809, where he assumed an Oriental name and costume, spent two years and a half in Syria learning the various dialects and customs of the people, and then visited Cairo to arrange for accompanying the caravan to Fezzan, and across the Sahara to Soudan. Meantime, he travelled through the Nubian Desert, and crossed the Red Sea to Mecca, where he remained four months. He returned again to Cairo in 1815, and in the following spring ascended Mount Sinai. At length the Fezzan caravan was ready to set out, and B. to go with it, when he was seized with dysentery at Cairo, and died October 17, 1817. He left his collection of 350 Oriental MSS. to Cambridge University. After his death the African Association published his interesting journals of travel. Perhaps the most important of these are his *Notes on the Bedouins and Wahabys* (Lond. 1830), and *Arabic Proverbs* (Lond. 1831).

Burden, or Burthen. See TONNAGE.

Burden, in Scotch law, signifies any restriction, limitation, or encumbrance affecting the person or property. Burdens are accordingly personal or real. Where a subject is conveyed to any one who, by acceptance of the conveyance, binds himself to pay a sum of money to the grantor of it, there being no clause charging the subject conveyed with the sum, the B. is personal; that is, it will be binding upon the receiver and his representatives, but will constitute no incumbrance on the lands or other subject conveyed. But where the right is expressly granted under the B. of a specific sum, which is declared a B. on the subject itself, or where the right is declared null if the sum be not paid, the B. is real.

Burden of Proof, or Onus Probandi, means, in law, the obligation to prove a fact or allegation, denied or not admitted. The general rule is that he who affirms must prove his affirmation; but this rule in its application often leads to questions of great nicety and importance; since on the question of, on whom does the proof lie? will frequently depend the issue of a litigation. In a civil case the solution may probably be found in considering which litigant ought to win in the absence of any evidence, or having regard to evidence so far as it has been given. In a criminal case, the B. of P. lies wholly on the prosecutor, if the prisoner plead *not guilty*.

Burdens, Public. See PUBLIC BURDENS.

Bur'der, Rev. George, a popular Congregational clergyman, born in London, 5th June 1752. After occupying impor-

tant ministerial positions in Lancaster and Coventry, he was translated to London in 1803, and was subsequently appointed to the editorship of the *Evangelical Magazine*. B. was one of the principals in forming the London Missionary Society, and projected the Religious Tract Society. He died 29th May 1832. His *Village Sermons* are still popular.

Burdett, Sir Francis, Bart., a popular English politician, was born January 25, 1770, and educated at Oxford. On the death of his grandfather in 1797, he succeeded to the family baronetcy. The most important part of his life was his parliamentary career. He sat first for Boroughbridge, next for Middlesex, and in 1807 for Westminster. Being the advocate of parliamentary reform, Catholic emancipation, and other liberal measures, he was a great favourite in the metropolis. B.'s life was a stormy one. On one occasion, after a struggle between the populace and the police, in which some lives were lost, he was imprisoned in the Tower, on account of a letter which he published in Cobbett's *Political Register*, and in 1819, for a letter reflecting on the conduct of the magistrates and yeomanry at the celebrated Manchester meeting, he was sentenced to three months' imprisonment in the Queen's Bench, as well as to pay a fine of £1000. In his later years he became a Conservative, and represented Wiltshire. He died January 23, 1844. B. married, in 1793, Sophia, the youngest daughter of Thomas Coutts, the celebrated London banker. His daughter, Angela Georgina, Baroness B.-Coutts, born 25th April 1814, is honourably known as one of the wisest philanthropists of the present time.

Burdock, or Burdocken (*Arctium Lappa*), a plant belonging to the natural order *Compositæ*, found in waste places, roadsides, &c., 'all over Europe and Russian Asia, except the extreme N., and naturalised in other parts of the world.' It is common in Britain. Five distinct species of B. have been described as British, but, according to Bentham, they are separated by too slight characters to be entitled to the distinction given them. The root causes perspiration, and can be used as a substitute for sarsaparilla. It smells disagreeably when fresh, but is inodorous when dry. The roots, young shoots, and young leaves are used in soups in some countries, especially in Japan, where it is cultivated for this use. The roots resemble artichokes in taste.

Burdwan, capital of an executive district of a division or commissionership of the same name in the province of Bengal, on the Dammuda, a tributary of the Hoogly, 74 miles N.W. of Calcutta. It is an important junction on the East Indian Railway, and has an active export trade, chiefly in coal, iron, and sugar. Pop. (1872) 32,321. The district of B. is singularly fertile, and has an area of 3523 sq. miles; pop. (1872) 2,034,745.

Bureau (Fr. a 'writing-table,' so called from the woollen baize, Lat. *burra*, with which it was covered), now denotes an office for public business, also a department of government, and even the officials of a department. Hence *Bureaucracy* is applied to a government by heads of departments, as distinguished from a government in which such officers have only subordinate authority.

Buren, Martin Van, the eighth President of the United States, was born at Kinderhook, New York, December 5, 1782. He entered the New York Legislature in 1812, and Congress in 1821, as a supporter of the Democratic party. He was successively senator, Secretary of State, Governor of New York, and Vice-President. B. was President one term (1837-41), succeeding his leader, Jackson, and gaining the election over Clay, Webster, and Harrison. The great financial crisis which occurred in 1837 involved the Administration in trouble, and the old Whig party under Harrison defeated B. in 1841. B. divided his party in 1848, and again ran for the presidency, but was once more defeated by General Taylor. He died 24th July 1862. B. was an adroit and politic public man.

Bureng, a valley and river near the Pir Panjal mountain, in Cashmere, some 40 miles S.W. of the town of Cashmere. At a certain point of its course the river disappears beneath the surface of the valley, which is remarkable for its numerous caves and subterranean watercourses.

Burg, a town in the province of Saxony, Prussia, on both banks of the Ihle, 13 miles N.E. of Magdeburg. It is on the

Berlin and Magdeburg Railway, and has eleven large woollen-cloth factories, employing 9843 hands, besides which there is much linen-weaving, machine-making, fulling, dyeing, &c. Pop. (1871) 15,184, of whom many are descendants of colonists from Belgium and the French Palatinate. In one of its four churches the service is still in the French tongue.

Burghage Tenure, in England, is the tenure by which all tenements in *burghs* or walled towns were formerly held, and which is not entirely lost. The tenure was a rent certain, payable to the king or lord to whom he had granted it; and differed nothing in effect from Socage (q. v.) tenure. The citizens of London held in B. T. of the crown, till they had a grant to hold in free burghage, or common socage. In Scotland, B. T. is originally constituted by a charter from the crown in favour of the burgh; the effect of which is to make every holder of property situated within the burgh hold directly under the crown as superior, for the *reddendo* (now merely nominal) of watching and warding; or, as it is commonly termed, 'service of burgh, used and wont.'

Burgas, or **Burghaz**, one of the most important havens of European Turkey, on the Black Sea, to the S.E. of the Balkan range, vilayet of Adrianople, 76 miles N.E. of Adrianople. It has a large export trade, mainly in wool, talc, cheese, and rose-water. Pop. 5000, chiefly Greeks and Turks. B. is the *Pyrgos* of the middle ages. To the N.W. is the much-frequented watering-place of Litzni. The Gulf of B., a beautiful inlet, receives the Mandra, and measures 14 miles across, having a depth of some five fathoms.

Burgeo Islands, a group of islets between Newfoundland and Cape Breton, at the entrance to the Gulf of St. Lawrence. They belong to Britain, and have a pop. of about 700, principally engaged in fishing.

Bürger, Gottfried August, one of the best of the German lyric poets, was born 1st January 1748, at Molmerswende, Prussian Saxony, and studied at Halle (1764) and at Göttingen (1768). There he led the life of a libertine, but the reproaches of his friends Voss and the Stolbergs, and the study of the ballad compositions of Schiller, Schlegel, Uhland, and especially of *Percy's Reliques*, inspired him with the desire to win a reputation in literature; but his years were passed in want and misery. He died 8th June 1794. B.'s ballads and lyric poems are extremely popular in his native country, and those which have been translated into English, as Scott's *William and Helen* from the *Lenore* volume (1794), and the *Wild Huntsman*, have found many admirers. His *Sonnets*, the first in German literature since the days of Gottsched, obtained the praise even of the unfriendly Schiller. His *Sämmtliche Werke* were published at Göttingen by Karl von Reinhard (4 vols. 1796-98; new ed. 1844). His life has been written by Döring in the Berlin edition of B.'s works (7 vols. 1824-25), and by Prohle (Leips. 1856).

Bürgermeister, the German title given to the chief magistrate of a municipality. It answers to the English *mayor*, Scotch *provost*, French *maire*, Spanish *alcalde*, Swiss *landamman*. In the free towns of Germany, the B. was something more than mayor, being president of the administrative council of the republic.

Burgess. Municipal or town corporations in England, except that of London, are now regulated by 5 and 6 Will. IV., c. 76. Under this statute, the government of a borough is vested in the freemen or burgesses existing at the passing of the Act, September 9, 1835. To be a B., a man must be of full age; he must have occupied a house or other premises in the borough for two years previous to the last day of August in each year; he must have been an inhabitant householder in the borough, or within seven miles of it; he must have been duly enrolled and rated for the relief of the poor; he must have paid his rates and taxes, except so far as they fell due within six months before 31st August.

In Scotland, B. is defined as a member of the corporation of a burgh, admitted either by the charter of erection or by birth, as being the son of a B., or by serving an apprenticeship to a B., or by marrying the daughter of a B., or by election of a magistrate of the burgh.—*Ball's Dictionary*.

Burgess Roll.—Overseers are required to make out a list of burgesses for each year by 1st September; the list is to be open

to inspection, without fee, till 13th September. The town-clerk is required to exhibit the list on the outer door of the town-hall, or some other conspicuous place, for one week previous to 15th September; burgesses omitted must give notice on or before the 15th. Lists of claimants, and persons objected to, to be published during the eight days before 1st October.

Burgh, in Scotland, corresponds to the English word *Borough* (q. v.). Before the Reform Bill of 1832, no B. in Scotland had any parliamentary representation as a B., except those constituted by royal charter. (See ROYAL BURGH.) By that bill, however, there have been created what are called *parliamentary burghs*, that is, towns which are not royal burghs sending members to Parliament, or so doing in conjunction with other towns. Of these there are fifteen, whose parliamentary representation is regulated by the Act above referred to, and by the Reform Act of 1868. They are Airdrie, Cromarty, Falkirk, Galashiels, Greenock, Hamilton, Hawick, Kilmarnock, Leith, Musselburgh, Oban, Paisley, Peterhead, Port-Glasgow, and Portobello. Before 1832, the Scotch burghal franchise was vested in the town councils. The Act of 1832 conferred it on householders paying a yearly rent of £10. Under the Act of 1868, all occupiers of houses in burghs paying taxes are enfranchised.

Burgh of Barony and Burgh of Regality.—There is now no practical distinction between a B. of 'barony' and of 'regality.' They are municipally governed by magistrates, either nominated by the baron or lord of the district, or chosen by the inhabitants themselves.

Burgh, Royal.—A royal burgh is a corporate body, constituted by a charter from the crown. The corporation consists of the magistrates and burgesses of the territory erected into a B. The magistrates are generally a Provost (q. v.) and bailies (see BAILIE), Dean of Guild (q. v.), treasurer, and common council. At the Union of England and Scotland there were seventy royal burghs in Scotland; of these, there were four in the county of Fife which did not send representatives to the Scotch Parliament. Between the date of the Union and the passing of the Reform Bill of 1832, Peebles and Rothesay had, as burghs, a share in parliamentary representation. This they have not had since 1832, their constituencies voting in their respective counties. Under Acts of Parliament passed since 1832, a new constitution has been given to the royal burghs, nine being excepted from the operation of the Act, on account of the smallness of their population. In the larger burghs, every one is now entitled to vote in the election of councillors who has been a resident for six calendar months next previous to the last day of June within the royalty, or within seven miles of it, and who is qualified by 2 and 3 Will. IV., c. 65, in respect of property or occupancy of premises within the B. to vote in the election of members of Parliament. In burghs which do not now send members to Parliament, property of the same value is required for the qualification. The councillors are chosen from the electors residing or personally carrying on business within the royalty; and where there is a body of burgesses in the B., each councillor, before his induction, must be entered a Burgess. This requisite will, it is expected, soon be done away with.

Burgh Acres are acres or small patches of land in the neighbourhood of royal burghs, usually *feued* (see FEU) to and occupied by burgesses or residents of the B.

Burghers. See UNITED PRESBYTERIAN CHURCH.

Burghs, Convention of Royal. By a statute of 1487, royal burghs are ordered to meet by commissioners once a year, to discuss questions connected with trade and the general welfare of the public, and to suggest remedial measures. The convention does not, however, seem ever to have had much legal authority; its deliberations have consequently never excited any strong general interest. It still meets annually in Edinburgh on the second Tuesday of July.

Burgh'mair, a family of German artists in the 15th and 16th centuries, the founder of which was a **Thomas B.**, whose name first appears in 1460 as an Augsburg painter. By far the most notable genius of the family, however, was **Hans B.**, painter and engraver, who was born at Augsburg in 1472, was the pupil of Dürer, and the father-in-law of Holbein. His fame rests upon his engravings, about 700 in number, many of them

grouped in separate series, of which the chief are the 'Ancestors of the Emperor Maximilian I.,' 77 plates; 'Triumph of Maximilian,' 135 plates; 'The Wise King, or the Acts of Maximilian,' 250 plates. Hans died in 1531.—His sons, **Friedrich** and **Hans**, were also painters, but inferior to their father. The latter, who was still alive in 1559, is best known by his finely painted *Book of the Tournament*, in the collection of the Hohen-zollern-Sigmaringen family.

Burglary, in the law of England, is the breaking into of a dwelling-house *by night*, any one being in it, and is punishable under the statute 24 and 25 Vict., c. 96, by penal servitude for life, or not less than three years, or imprisonment for not above two years, with or without hard labour.

By the statute, *night* is from 9 P.M. to 6 A.M. No building within the same curtilage is to be held as part of a dwelling-house, unless there be a passage between. Any one found *during the night* in a house, armed with a dangerous weapon or implement of housebreaking, or having his face disguised, is guilty of a misdemeanour, and is liable to imprisonment, with or without hard labour, for three years.

To constitute B. the breaking must be in the *night*. It must be in a dwelling-house. There must be *entry* with a felonious intent. Entry by day and breaking out by night is B. If a servant enters his master's room with felonious intent, he commits B. It cannot be committed in a tent or booth, though the owner lodge in it. The crime can only be committed in a permanent building. See HOUSEBREAKING.

Bürklen, a Swiss village in the canton of Uri, with a pop. (1870) of 1391, is the birthplace of William Tell. A chapel now stands on the supposed site of the patriot's house, and its walls are adorned with representations of scenes from his life.

Burgos ('the fort or castle'), a city of Northern Spain, capital of the province of B., on the right bank of the Arlanzon, at the foot of the Sierra d'Oka, about 145 miles N. of Madrid. It is a fortress of the first rank, the headquarters of a captain-general, the seat of a cardinal-archbishop, and of several judicial and military courts. B. is separated by the river from its suburbs La Vega, Las Huelgas, and San Pedro. It has numerous churches, of which the finest is the cathedral (built in the 13th c.), the glory of the town, and one of the most splendid structures in Spain. As the centre of the great roads to Madrid, Valladolid, Santander, Bilbao, and France, and also connected by railway with Tolosa, Vittoria, San Sebastian, and Irun, on the French frontier, it is a place of considerable traffic. It has, besides, a trade in woollen cloths, linens, hats, and leather. In the castle of B., Edward I. of England was married to Eleanor of Castile. The town is memorable in the Peninsular war for the annihilation of the Spanish army by Soult in 1808; as well as for the repeated attempts of Wellington to storm it in September and October 1812. Pop. 27,000. The province of B. has an area of 5628 sq. miles. Pop. (1870) 353,560.

Burgoyne, Sir John Fox, Bart., a distinguished British officer and engineer, was born in London, 24th July 1782. He entered the Royal Engineers in 1798, served in the Peninsula under both Moore and Wellington, taking an active part in the sieges of San Sebastian and Burgos. He was also, in 1814, the commanding engineer of the expedition to New Orleans. During the Crimean War he was head of the engineering department, until recalled in 1855. B. filled various offices, both at home and abroad, of honour and emolument, including that of inspector-general of fortifications, was made general in 1855, and baronet in 1856. He died October 7, 1871. See his *Life* by Colonel Wrottesley (Lond. 1873).

Burgoyne, John, a British general, was the natural son of Lord Bingley, and was born about 1730. He entered the army at an early age, proved himself to be a brave officer, and in 1762 showed very considerable skill and enterprise as commander of a portion of the British troops in Portugal and Spain, capturing Alcantara. In the American war of independence, he led the army which was to penetrate from Canada into the revolted provinces, but being misled by an apparent retreat on the part of his opponents, and failing to maintain his communications with Canada, was compelled to surrender to Generals Gates and Arnold at Saratoga. He returned to England, and being offended with the Ministry of the time on

account of his having been refused a court-martial and an audience of the king, he went over to the Opposition, and threw up his appointments. On a change of Ministry he became commander-in-chief in Ireland, an office which he held for two years. He now devoted himself to literature, and produced four dramas, *The Heiress*, *The Maid of the Oaks*, *The Lord of the Manor*, and *Richard Cœur de Lion*, besides a probationary ode and some pamphlets in his own defence. B. was one of the managers of the impeachment of Warren Hastings, but died June 4, 1792, before the trial was concluded. His writings were published in 2 vols. in 1808.

Burgundy (Fr. *Burgogne*) is a name that has not always been given to the same extent of territory, nor to the same kind of state. Its different uses, both geographical and political, will appear in the course of the article, but it may here be noted that the name is best known to Englishmen as that of a sovereign duchy, and afterwards of a province in the E. of France, in the basins of the Seine, the Loire, and Rhone, now represented by the departments of Côte d'Or, Yonne (in part), Saône-Loire, and Ain, with an area of nearly 12,000 sq. miles, and a pop. (1872) of 1,699,752. This region, also called Lower B., in contradistinction to Upper B., or *Franche Comté*, is full of fertile plains and soft rounded hills, has an extensive culture of the vine (see **BURGUNDY WINES**), numerous and flourishing industries, great mineral wealth (iron, lead, coal, &c.), and many important towns, as Dijon, Châlons-sur-Saône, Autun, Auxerre, Auxonne, and Bourg.

Kingdom of B.—The Burgundians (*Burgundii* and *Burgundiones*), a Germanic people, originally settled on the banks of the Vistula and Oder, wandered S. W. into the Neckar and Rhineland district, and about the year 407, under their king Gundicar, burst into Roman Gaul, 80,000 strong, seized the lands between the Aar (in mod. Switzerland), and the Rhone, accepted the Arian form of Christianity, and so founded the *Old Burgundian kingdom*. They proved a thrifty, peaceful, and kindly race, and were rather liked by the Gallo-Romans, whom they had mastered. Gundicar, according to the *Nibelungenlied*, fell in the great battle against Attila on the plain of Châlons in 451. To a later Burgundian king, Gundebald, we owe the code known as the *Lex Gundobaldi*. In a struggle with the Frankish kings Childebert and Chlotair, the Burgundian Godemar lost his life and crown in 534, and B. became a province of the Frankish kingdom. On the death of Chlotair in 567, the Frankish kingdom was divided into four parts, of which B. was one. Its limits at this period are not very clearly defined, but it embraced Western Switzerland, and the valleys of the Saône and Rhone almost to the Mediterranean. See Binding's *Geschichte der Burgund. Röm. Königr.* (1863), and Kitchin's *History of France* (Lond. 1873), which contains maps of the greatest value to the student. The land won back its independence through Count Boso of Vienne, who in 879 made himself king of the *Cis-Jurane* kingdom of B. or Arles (Arles), and through Count Rudolf I. of the Guelph family, who in 899 was made king of *Trans-Jurane* B. Both acknowledged the Emperor of Germany as their 'over-lord.' Rudolf II., son of the latter, in 930 united both parts of the Burgundian kingdom. His grandson, Rudolf III. (died 1032), appointed as his heir the Emperor Heinrich II. (died 1024), son of his sister Gisela, and after him the Emperor Konrad II., his grand-nephew, passing over his nephew Odo of Champagne. Heinrich III., however, son of Heinrich II., was at an imperial diet held at Solothurn in 1038 formally elected and crowned king of B. From this time B. belonged to the German Empire, and was under hereditary rulers. Friedrich Barbarossa, who was crowned at Arles in 1178, brought B. into the closest union with the empire. But after the death (1378) of Karl IV., the last of the German emperors crowned at Arles, the kingdom of B. was broken up into several independent territories, which gradually, with the exception of Savoy and Mömpelgard, fell to France. Up to this point, the history and politics of B. are strictly German.

Duchy of B.—This was founded by Richard, Count of Autun (brother of Boso of Vienne), who died in 921. His son, Rudolf, died in 936 without heirs; but a grand-daughter, Ludgardis, having married Odo, brother of the French king, Hugo Capet, and owner of part of B., the whole was reunited. From Odo are descended the earlier Dukes of B., whose line became extinct in 1361 in the person of Duke Philippe, whereupon King Jean of France annexed the duchy to the French crown, but

soon after (1363) gave it to his youngest son, Philippe the Hardy, who became the founder of the later Dukes of B., and through his marriage (1369) with Marguerite, Comtesse de Flandres, obtained not only that county, but also Mecheln, Antwerp, and Franche Comté. His son, Jean, caused the Duc d'Orleans to be murdered in 1407, and was himself murdered (1419) at the instigation of the Dauphin. He was succeeded by his son, Philippe the Good, who acquired Namur (1429), then Hainault, Holland, Zealand, Brabant and Limburg by the peace of Arras (1435), important cessions of French territory, and in 1443 the duchy of Luxemburg. He died in 1467. His son, Charles the Bold or Rash (q. v.), added to his multiplex dominions Gueldres and Zutphen (1473), but left no male heir. Louis XI. immediately annexed the duchy of B. to the French crown, and it continued a province of France down to the Revolution, when, like the other provinces, it was cut up into departments. The other hereditary possessions of Charles—viz., the Netherlands—went to his daughter Marie, who married the Archduke Maximilian of Austria, and, through their grandson, the Emperor Charles V., were brought into unhappy connection with Spain, but their history forms no part of that of B. proper. It may be noticed that Franche Comté, or Upper B., was given to Maximilian in 1493, and that it was only restored to France by the peace of Nymwegen in 1678. See Barante, *Histoire des Ducs de Bourgogne* (8th ed. 1858), and Dubois, *La Bourgogne depuis son Origine* (1863).

Burgundy, Louis, Duke of, grandson of Louis XIV., was born at Versailles, 6th August 1682. He displayed from his earliest years a passionate, cruel, and brutal character, which, as he advanced in years, developed into one of boundless licentiousness. The Duc de Beauvilliers was charged with the task of effecting a reformation. He called Fénelon and Fleury to his aid, and according to the courtly Saint Simon they completely succeeded. Other reports, however, are less favourable. In 1697 Louis, who was deformed from his birth, married Marie-Adelaide of Savoy, and henceforth wasted his time in the most frivolous amusements; so that, when called to command the army of Germany in 1701, his miserable failures hardly excited surprise. He became the jest of his own soldiers, and soon withdrew to court. On the death of his father in 1711, he became immediate heir to the crown, but died suddenly, 18th February 1712, six days after his wife and their son, the Duke of Bretagne, and all three were conveyed to St Denis in the same hearse. That a character radically so weak and vicious should have become as transformed as Saint Simon, Fleury, and especially Père Martineau, the Duke's Jesuit confessor, author of a volume entitled *Les Vertus du Duc de Bourgogne*, assert, is less credible than that the heir of France, stricken down so suddenly, should find among courtiers not only apologists, but eulogists.

Burgundy Pitch, a resinous exudation collected from the stem of the spruce fir (*Abies excelsa*). Pure B. P. is a yellow opaque substance, hard and brittle when cold, with an agreeable aromatic odour. It is produced in Finland, and in the Black Forest, and other parts of Germany, but it has no connection, beyond the name, with Burgundy. It is used in medicine only as an ingredient in plasters, but in Germany it is employed with rosin for lining brewers' casks. It is very seldom found pure, and indeed the greater part of what is sold as B. P. has none of that particular resin in its composition.

Burgundy Wines. Under the name of Burgundies several well-known wines, both white and red, are derived from Central France. Of the red wines, the best-known brands are Chabertin, Clos Vougeôt, Volnay, Beaune, and Macon; the white brands include Chablis, Pouilly, Meursault, and Montrachet. Burgundy is a fuller-bodied, more generous wine than claret, but is said to encourage gout. It is of great service in cases of weakness and impoverished blood.

Burhanpur, a walled town of India, Central Province, district of Nimar, on the Tapi, and a station of the Bombay and Benares Railway, 280 miles N.E. of Bombay. It has manufactures of silks, muslins, and brocades. B. was formerly in the Gwalior territory, but was exchanged, along with the rest of Scindia's possessions S. of the river Nerbudda, for land on the Betwa river in 1861. Pop. (1872) 29,303.

Burial of the Dead. The disposal of the dead has always been accompanied by ceremonial observances indicative of

respect and reverence, though these have differed greatly among different races at different times. The primitive idea, of providing a habitation for the dead gave rise to the various forms of barrow-burial (see **BARROWS**), and its characteristic customs, the most prominent of which was the furnishing of the house of the dead with the implements, utensils, and ornaments of the present life. These burial customs were the natural offspring of the purely material conceptions of a future existence characteristic of Paganism, and were not confined to the ruder periods of prehistoric times. Semiramis buried her husband in the palace at Nineveh, and raised over him a vast mound of earth, which remained after the destruction of the city. The tombs of the Etruscans were splendidly furnished, and the dead lay on couches, surrounded with their arms and ornaments, and all the appliances of a luxurious life. Cremation, which commenced in the Stone Age, became characteristic of the higher civilisation of the Age of Bronze; but though it abolished the great stone chambers, as no longer congruous or necessary when the body had been reduced to a handful of ashes, it did not entirely abolish the custom of depositing with the dead the prized possessions of the present life. Cremation was practised by the most refined and polished nations of antiquity. Among the barbarous races of Northern Europe, in the later Iron Age, it was accompanied by the immolation of human victims. The high-caste Hindus still burn their dead, and *suttee*, or the sacrifice of widows on the funeral pile of their husbands, is only prevented by penal enactments. Both cremation and inhumation are practised in Japan, and the Shans of Northern Burmah bury the common dead, but burn their priests. Cremation, however, has always been a distinctively Pagan rite, and though a return to the ancient practice has been recently advocated on sanitary grounds, it has never been sanctioned by any section of the Christian Church. While tolerating many of the other burial customs of Paganism—as, for instance, the placing of ornaments and insignia in the grave, the burial of the corpse in robes of office, depositing with it pieces of money, vases of clay, and other objects of common use or ceremonial significance—the practice of cremation was always prohibited under the severest censures and penalties. Other methods of disposing of the dead, such as embalming, were practised indifferently by Pagans and Christians. Among the Egyptians this art was specially cultivated. It was practised in a modified form by the Jews, and there are traces of somewhat similar customs among the ancient Peruvians, whose cemeteries present many points of resemblance with the mummy-pits of Egypt. The modes of burial practised by savage tribes afford striking illustrations of the sepulchral customs of prehistoric times. The Esquimaux bury their dead under cairns, the corpse being placed in the contracted posture characteristic of all early burials, with the knees drawn up to the chin. The dead man's implements and weapons are placed beside him, and sometimes even his boat is buried with him. In Tahiti, again, in the period of their Paganism, the dead were laid on platforms in the open air, covered by a roof and protected by a fence. The weapons of the deceased were laid by his side, and a supply of food and drink placed for him. When the body had decayed, the bones were collected and placed in a pyramidal pile of stone-work erected as a monument. Some of these are suggestive of the enormous size of the monumental structures of the early Stone Age. One measured 267 feet in length, by 87 feet in breadth, and 44 feet in height, being regularly built in stages like a pyramid, and entirely without metal tools. The burial customs of Christian times, though marked at first by the survival of the less objectionable usages of Paganism, became subsequently distinguished by their severe simplicity and absence of ceremonial. In the first four centuries the Christians of Rome buried their dead in the catacombs, decorating their tombs with paintings and sculpture, and substituting scriptural subjects for those of the heathen mythology previously in use. In later times, when cemeteries were attached to the churches, burial in consecrated ground became the universal practice of Christendom.

Burial Regulations. In England, on representation of a Secretary of State, an Order in Council may, for the protection of the public health, prevent the opening of new burial-grounds in any city or town, or within other limits; or may order, wholly or partly, the discontinuance of burials in places specified in such

order. The order does not extend to the burial-grounds of Jews and Quakers, unless expressly included. On the petition of a borough council, the crown may, by order, give it power to provide burial-ground. On order, the borough council acquires the power vested in burial boards under 16 and 17 Vict., c. 134. Expenses are to be paid out of the borough funds or rates. Money may be borrowed at a lower rate of interest to pay off securities bearing a higher rate. There are special provisions for metropolitan burials and cemeteries.

Burial Societies are Benefit Societies (q. v.) constituted in the usual manner. Their object is to supply money for paying the funeral expenses of deceased members, or of any of their family. The system for a while led to fearful abuses. It was found that children, and even adults, were sometimes insured in more than one society, and then either killed or allowed to die of neglect. The stringent regulations made by Parliament for certifying cause of death before any insurance is allowed to be paid, have had a most beneficial effect in preventing these crimes.

Buridan, Jean, a scholastic of the 14th c., born at Béthune, in Artois. After studying under William of Occam, he taught philosophy at Paris University, of which he was rector in 1347. According to one account, he was murdered by command of Marguerite of Burgundy; according to another, he was driven to Austria because of his adherence to Nominalism. He is the reputed author of the sophism known as 'B's Ass,' which asserts that a hungry ass will starve if set between two equally attractive bundles of hay, as there is nothing to determine its choice of either. B's most important works are the *Summula Dialectica* (Par. 1487); *Compendium Logicae* (Ven. 1489; Oxf. 1637); *In Aristotelis Metaphysica* (1518).

Burin (Fr. *burin*), an almost obsolete name for the tool now called a graver, used by engravers in steel, copper, and silver. It is made of tempered steel, is of a diamond form, and has the graving end ground off obliquely to a sharp point. From the characteristic handling of the tool by picture engravers came the expressions *brilliant B.*, *soft B.*

Buriti Palm (*Mauritia vinifera*), a tall, graceful palm found in the swamps of the northern parts of Brazil and Guiana. It receives its specific name (*vinifera*, wine-bearing) from the juice, which is extracted from the stem, and used as a drinking beverage. The tree, however, has to be cut down in order to obtain this juice. An oily pulp surrounds the seeds, which is used as food, and as a preserve by preparing with sugar.

Burke, Edmund, one of the greatest orators and politicians, and, in the opinion of De Quincey, the 'supreme writer' of the 18th c., was born at Dublin, January 12, 1728 or 1729. His father was a solicitor, of good family, and a Protestant; his mother, whose maiden name was Noyle, was a Roman Catholic; his schoolmaster (Abraham Shackleton of Ballitore, Kildare) was a Quaker. B. was educated at Trinity College, Dublin, where he was a more than average student, and much given to miscellaneous reading. He then became a law student in London, but is described as being 'fond of literature, and anything but fond of law.' In 1756 B. came before the world as an author, his first work being *A Vindication of Natural Society*, a parody of Bolingbroke's arguments regarding society. His next work, an essay on the *Sublime and Beautiful*, although now considered shallow, established his reputation as a writer, and obtained him an entrance into that society of which Johnson, Garrick, and Reynolds were among the chief stars. In 1759 he became private secretary to Mr W. G. Hamilton, commonly known as 'Single-Speech Hamilton,' then Secretary for Ireland, accompanied him to Ireland, and is believed to have prompted the efforts of Government for relaxing the penal laws against Roman Catholics. In 1765, B. quarrelled with Hamilton, but became private secretary to the Premier, the Marquis of Rockingham, who continued his friend to the last. In 1766 he entered Parliament as member for Wendover. For nearly thirty years he sat in the House of Commons as member in turn for Wendover, Bristol, and Walton, obtaining the reputation of being the most conscientious of politicians, and the greatest, though not, at least latterly, the most popular of English orators. We can only give a few of the leading incidents in B.'s career. He

was a most strenuous advocate of a policy of conciliation with America, and he prepared the way for the abolition of the slave trade. In 1780 he brought forward a great scheme of economical reform, only a portion of which was adopted. In 1781 he sat on a committee of inquiry into Indian government, and he was chief promoter of the trial of Warren Hastings, which began in 1788, and did not end till 1796. He separated from the Whig party on the subject of the French Revolution, his opposition to which he has expressed in three of the best-known and most eloquent of his productions—*Reflections on the French Revolution* (1790), *An Appeal from the New to the Old Whigs* (1791), and *Letters on a Regicide Peace* (1796). He held twice the office of Paymaster of the Forces, first under Lord Rockingham, and next under Lord North. Finally he retired from Parliament in 1794, with the thanks of the House of Commons for his services, and pensions to the amount of £3700. Being attacked on account of these by the Duke of Bedford, he replied (1795) in one of his most spirited papers, entitled *Letter to a Noble Lord*. B., who was married in 1757, received in the death of his only son, a young man of great promise, a blow from which he never recovered, and he died at his residence of Beaconsfield, July 9, 1797.

In private life affectionate, benevolent, and virtuous; in public life, and during a period of corruption, a purist; having none of 'that master-vice, sloth, in his disposition,' B. is one of those men of whom Great Britain will always be whole-heartedly proud. There is much dispute as to his position as a man of letters and a political philosopher; Carlyle terms him 'a resplendent, far-sighted rhetorician, rather than a deep, sure thinker;' and it is undeniable that his imagination and strong passions led him into extravagances both of speech and of action. But it will always be admitted that he was a thoroughly sincere politician, anticipating in regard to many matters future generations; that, everything considered, he was the first orator of his time; and that in splendour of style he comes next to Milton as a writer of English prose. B.'s works have passed through many editions; the latest, which began in 1866, being that of the Clarendon Press. The best biography of him is that by Mr J. Macknight (1858-60). See also Morley's *Edmund Burke, a Historical Study* (Lond. 1869).

Burleigh, Lord. See CECIL.

Burlesque (Ital. *burla*, 'mirth, mockery'), the lowest of the three mirth-producing arts—comedy, farce, B.; it distorts and caricatures, and contrasts incongruities, without aiming at the final harmonising of them which is the soul of comedy, and should not be totally neglected in farce. Lucian is the greatest master of B. among the ancients. It was first made popular in modern times by Berni in Italy and Scarron in France. See Flögel's *Geschichte des Burlesken* (Leips. 1794).

Burlett's (dim. of Ital. *burla*, 'mirth, mockery'), a musical farce or comic opera.

Burlington, a city and port of entry in the state of Vermont, U.S., on the E. side of Lake Champlain. It has the best harbour on the lake, and is the largest town in the state. The city stands on a fine site, a high ground with the lake and its islands in the near view, and the Adirondack Mountains, 5000 feet high, in the distant W. It has daily steamboat communication in summer with Rouse's Point and White Hall, the opposite ends of the lake, and thence by rail with New York and Montreal. In 1874 its imports amounted to 7,225,042 dollars, and its exports to 3,733,148 dollars. The state university of Vermont, founded in 1791, is placed here, and the city has, besides, excellent schools and academies. B. contains the tomb of Ethan Allen, a famous Revolution hero. Pop. (1870) 14,387.

Burlington, a town in New Jersey, U.S., on the Delaware, between Philadelphia and Trenton, and about 20 miles above the former city, with which, as well as with New York, it is connected by railway. Pop. (1870) 7000.

Burlington. See BRIDLINGTON.

Burma, or **Ava**, an inland kingdom of Further India, between India and British B. on the W., China on the E., and British B. and the states of the Indo-Chinese peninsula on the S. Area, 170,000 sq. miles; pop. from three and a half to four millions.

The trend of the great rivers of the country, the Irrawaddy and the Salween, which flow from N. to S., sufficiently indicates the general slope of the surface. There are alpine regions on the northern frontier, near the sources of the Brahmapootra and the Mikong; but towards the S. the mountains give way to thickly-wooded hills and verdant fertile uplands, while near the southern frontier rich alluvial plains occur. 'The richness of these hills and mountains is only surpassed by the amazing fertility of the plains, nature seeming to have lavished her choicest gifts in every possible way and direction,' writes Captain Bowers, in his *Bhamo Expedition*. The climate is described as excellent throughout, though the forests are said to be dangerous from malaria. The temperature ranges from 50° to 70° Fahr., and is remarkably equable. Rice is the principal product, but maize and wheat are grown on the slopes and hillsides, and the tender tops of bamboo shoots, which taste like parsnips, form an important article of food. The plantain and mango are the favourite fruits. Tobacco and tea are grown. B. abounds in teak, pine, varnish wood, and other valuable timber-trees; while gold, silver, iron, and copper are believed to exist in great quantities. The tiger, leopard, tiger-cat, elephant, rhinoceros, buffalo, and Indian ox, haunt the forests and plains. The Burmese are muscular but not tall, and fond of athletic exercises. The four great races are the Môn, the Karen, the Burman, and the Tai or Shan. The Môn occupy the sea-coast and lower valleys of the great rivers. The Karens and wild tribes are scattered over the mountain-ranges. The Burmans (pure) occupy the upper Irrawaddy, Tavoy, and Mergui, while another sect (Mugs) occupy Arakan. The Shans are found on the borders of Siam. Besides these, there are numbers of Chinese and natives of Hindustan that have settled in the country since it became a British possession.

Religion, Education, Language, and Literature.—The religion of B. is Buddhism (q. v.), and, judging from the esteem in which the priests or monks are held, and by the innumerable monuments, monasteries, and temples in the country, and from the circumstance that the monks are the recognised and almost the only teachers of the youth of the land, this form of heathenism is a living and a considerable force among the Burmans. The latest incarnation of Buddha is worshipped under the name of Gautama, whose images and temples everywhere abound. The monks, called *pan-gyes*, live in monasteries, or *kyoungs*—are supposed to observe vows of celibacy, poverty, and seclusion—and are supported exclusively by the contributions of the people, for which, however, they make a valuable return in educating all the children in the villages around their *kyoungs* in reading, writing, and arithmetic. The children are called into the monasteries in the morning, and are there instructed for several hours. A monk may be released from his vows, and resume the active duties of life at any time. Two languages and two alphabets are in use—the Burman and Pali. The former, belonging to the monosyllabic group, is the vernacular. It is without inflexion, and the characters are formed of circles, segments of circles, and combinations of these. A set of the Pali *Tripitaka* or Buddhist Scriptures, written on palm-leaves, and filling fifty boxes, was presented by Sir A. Phayre to the Library of the Indian Office in 1875. Burman literature embraces songs, religious romances, and chronological histories.

History.—The Burmese claim descent from the Sakya kings of Kapilawasta, from whom sprang Gautama, the latest Buddha, who is said to have been born in the 6th c. B.C. The first tangible fact in their history, however, is the establishment of their seat of government, in 1364, at Ava, which continued to be the capital for 369 years. In the middle of the 16th c., Europeans (Portuguese) first became acquainted with B., which at this time had risen to the zenith of its power, having conquered the Peguans, and all but subjugated Siam. After having been subject to the Burmese for about 250 years, the Peguans, in the beginning of the 18th c., rose in insurrection, abolished Burmese supremacy, and in 1752 captured Ava, and carried off its king captive to Pegu. Meantime, a hero had arisen to restore the fame of the Burmese arms, in the person of Aloung-Zaya, a man of obscure birth, who, after defeating the Peguans in several minor engagements, recaptured Ava in 1753. This patriot became King of B., and assumed the name of Aloung-Phya, which Europeans have corrupted into Alompra. His career, if brief, was brilliant. He drove the Peguans out of B., reconquered Pegu, and carried his victorious followers across

Siam to the walls of Bangkok. Alompra died in 1760, and was succeeded by his son, who in his turn was succeeded by his brother, Tshen-byo-yen, 'the King of the White Elephant,' during whose reign an immense Chinese army, sent to annex the country, was defeated. This king was succeeded by his son in 1776, who reigned five years, and was succeeded by Moun-Moung, grandson of Alompra, a mere puppet in the hands of his uncle, who supplanted him, and ascended the throne in 1781 under the name of Men-tara-gyee. This prince, in whom the active spirit of Alompra seemed to survive, annexed Arakan to the Burman empire. He died after a reign of thirty-eight years, during which he removed the capital to Amarapura, and was succeeded by his grandson, Phya-gyee-dau, in 1819. It was during the reign of Men-tara-gyee war first broke out between the British and Burmese (see **BRITISH BURMA**), which resulted in the cession of Arakan and Tenasserim to the East India Company. Phya-gyee-dau removed the capital back to historic Ava in 1822. He was dethroned in 1837, and was succeeded by his brother Tharawadi; but he exhibiting symptoms of insanity, was put under restraint in 1845, and his eldest son, the Prince of Pagan, appointed regent. During his tyrannic regency the secret war between Britain and Burma, by which the British secured the rich provinces of Pegu and Martaban, took place. The tyrant was deposed, and another son of Tharawadi, Prince Mendon-Men, who ascended the throne in 1853, and died in 1878. Early in his reign he removed the court to Mandalay. In 1855, a British embassy was commissioned to the Burmese court, under Major, now Sir A. P. Phayre, to endeavour to arrange a commercial treaty on the basis of former arrangements; but the king, who had refused to sign a treaty recognising the British annexation of Pegu and Martaban, would not listen to the British ambassador. The attempt to arrange a commercial treaty was again made by Sir A. P. Phayre in 1862, with partial success. Meantime, however, the Burmese king, though unwilling to agree to a treaty, had become not only a trader, but a monopolist on his own account. This object gave rise to much discontent among the Burman nobles, which was intensified by the impression that the court was more to be removed, to the loss of its strong landholders. The outcome of this feeling was that five of the king's sons headed a rebellion to dethrone their father. Mendon suppressed the insurrection, after which one of his sons fled to the Shan States, while the other sought British protection in Bengal. After the rebellion had been crushed, Sir A. P. Phayre was sent the third time to Mandalay on the same purpose as before, but the king was so much elated by his triumph over the rebels to listen to any proposals from a foreign power. In the following year, however (1867), Colonel Fytche, on the part of the British Government, concluded a treaty with the Burmese king, whereby trade in B. was thrown open to British subjects, and a commercial court, to be presided over by the British political agent, for the decision of trade disputes, was to be established at Mandalay. This treaty, during the life of Mendon, remained a dead letter. The author of the *Land of the White Elephant*, writing in 1873, thus describes the commercial and other relations subsisting between the king and the so-called government of B.: 'At present there is a royal monopoly of the *paddy* (rice) and cotton, and other leading products—maize, amber, gold, copper, coal, and gems above a certain size (all over 100 rupees in value). The king will not leave his palace for fear of foul play, and has never seen his own war-canoes or steamers. There is no government in B., and bribery and corruption prevail in every department. The king sets the example. He appropriates most of the revenue; he buys goods from merchants, and, putting his own value upon them, serves them out as pay to his troops and servants, who, rushing with them to the market-place, find they can only obtain for them a fraction of the price at which the king had valued them.' Matters have not improved since the accession of Theebaw in September 1878. That monarch at first seemed disposed to follow prudent and enlightened counsels, but his political moderation was only a mask. A massacre (1879) of all his near kinsmen, under a half-maniacal terror of conspiracy, sent a thrill of horror through the East; and it is not difficult to predict what policy will be forced upon Britain should some radical change not take place in the character and habits of this drunken savage. See Yule, *Narrative of a Mission to the Court of Ava* (Lond. 1858); Marshall, *Four Years in B.* (2 vols. Lond. 1860);

Mason, *B., its People and Natural Productions* (Rang. 1862); Captain Bower, *Bhamo Expedition* (Rang. 1869); Vincenti, *Land of the White Elephant* (1874); and Gordon, *B. and its Inhabitants* (Lond. 1876), and Fytche, *B., Past and Present* (Lond. 1878).

Burma, British, a province of British India under the government of a chief commissioner, is a maritime country on the W. side of the Indo-Chinese peninsula, washed on the W. by the great Bay of Bengal, and bounded on the E. by the dominions of Burma and Siam. It extends in lat. between 22° 40' N. and 10° S. Area, 88,556 sq. miles; pop. (1876) 3,010,662. It consists of three divisions—Arakan in the N., with four districts; Pegu, the central division, with five districts; and Tenasserim, in the S., with six districts. It extends for nearly one thousand miles along the shore of the Bay of Bengal, from the Naaf estuary, in about 20° 50' N., forming the boundary between Arakan and Chittagong to the Pakehan stream, which separates Tenasserim from Siam a little S. of 10° N.

Physical Aspect, &c.—The surface, which presents every variety of beautiful scenery, is mountainous in the N., and undulating or flat in the S. The country is traversed from N. to S. by rivers and streams having their sources in the Himalaya, and the chief of which are the Kuladan, Irrawaddy, Sittang, and Salween. The parallel valleys of these rivers are separated by hill-ranges, which attain considerable altitude in the N., but gradually diminish in height towards the S. Of the whole area, one-half, or about 45,000 sq. miles, is cultivable, but little more than one-twentieth part is yet cultivated. The rivers as they approach the sea form wide and exceedingly rich deltas; the uplands are fertile, while along the eastern boundaries are ranges of mountains rising in some localities to the region of pines and rhododendrons.

Climate, &c.—The climate, which is moist and somewhat depressing, is tempered along the coast by the sea-breezes, and only the forest tracts during the rainy season are hurtful to Europeans. The S.W. monsoon, which sets in in May, brings up a continuous stream of rain-clouds from the Pacific, which, striking on the hills of Arakan and Tenasserim, are condensed, and fall in ample rains during half the year. In the delta of Pegu the rains are plentiful, but not heavy, while in the N. of this division, which is sheltered from the S.W. monsoon by the Arakan hills, rains are scanty, and drought is sometimes felt. The thermometer ranges from 75° to 85° along the coast during the S.W. monsoon (from May to October); during April and May it sometimes rises to 100° in the shade, and in the northern part of Pegu it ranges to a maximum and minimum of ten degrees above and below what it registers on the coast. Cold weather prevails on the higher mountains, and frost is frequent there in winter. Among the natives epidemics are neither frequent nor fatal, but infant mortality between the ages of one and six is very high. The British regiments stationed at Rangoon and Maulmain near the coast, and at Thayetmyo and Toungoo on the northern frontier, enjoy excellent health during their four years' service.

Products, &c.—The soil is fertile, and the productions are at once various, valuable, and practically limitless in quantity. The staple products are rice, teak wood, and cutch; but excellent cotton, tea, coffee, sugar, tobacco, cinchona, and indigo are successfully cultivated, and among the native trees are the catechu, cocoa, areca palm, plantain, jack, mango, durian, and mangosteen. The *Fauna* include the elephant, rhinoceros, bison, hog, deer, buffalo, bear, otter, tiger, leopard, and monkey, and there are pheasants, peacocks, and other game in considerable variety. Coal and tin occur, and there are petroleum wells in the valley of the Irrawaddy.

Revenue, Trade, &c.—The progress which the country has made since it came under British rule is very remarkable. Take, for example, the following table of the revenue and expenditure in the years 1864, 1873, and 1876 respectively, with the imports and exports for the first two of these years:—

	1864.	1873.	1876.
Revenue,	£947,948	£1,309,834	£2,004,813
Expenditure,	521,793	666,626	675,935
Imports,	565,519	1,753,345	...
Exports,	1,030,733	3,795,580	...

Of the customs on imports, amounting in all, in the year ending

March 1873, to £83,000, the customs on imported cotton twist, thread, and piece-goods amounted to £22,956; on spirits, £25,998; on silk piece-goods, £6058; and on wine, £3021. The customs on exports in the same year amounted to £359,752, of which £357,682 was received from the exports of rice alone. The export trade of B. B. may be said to consist substantially of exports of rice, cutch, and teak timber, while the imports consist mainly of British manufactured goods. The principal ports where this trade is carried on are Rangoon (q. v.), Akyab (q. v.), Bassein (q. v.), and Maulmain (q. v.), from which there are shipped annually, by upwards of thirty firms, about 850,000 tons of rice—one house alone (Bulloch Brothers & Co.) exporting nearly 200,000 tons. The chief articles sent from B. B. into Burma, by the rivers Irrawaddy and Sittang, are betel-nuts, cotton twist and yarn, crockery, dried fish and fish-paste, silk, cotton, and woollen piece-goods, rice, paddy, and salt; while among the articles imported by the same route the chief are teak timber, copper, raw cotton, cutch, dyes, earthen, lacquered, and hard ware, gold leaf, &c. In 1867-68 the value of this trade was over £2,500,000. Since that time it has increased, and it is capable of indefinite expansion, could the industry of the Western nations be brought into direct co-operation with the industry of the Chinese, by opening a trade route between the Upper Irrawaddy and the Yangtse. Measures are still (1879) in progress to effect this desirable object. The resources of B. B. are abundant, and though much money has been spent in the embankment scheme of the Irrawaddy (over £266,300 in all down to the close of 1875), the facility with which an increasing revenue can be here collected encourages the Indian Government in carrying out important public works. A railway is now (1879) constructed between the capital, Rangoon, and the frontier, which in a few years will doubtless be extended through Burma to China. The land-tax is light, but is rapidly becoming productive as the cultivable land is being taken up for agricultural purposes, and is supplemented by the capitation-tax peculiar to this province; while the rice duty is reported at present to fall wholly upon the producer, and thus to be equivalent to a further enhancement of the land-tax. The holders of the land are the actual cultivators, and the plots average about five acres. The province is governed by a chief commissioner, appointed by the Indian Government. It is defended by 5517 troops (2232 being British), commanded by 128 British officers.

History.—The East India Company made several attempts early in the 17th c. to establish trade with the King of Burma, and a letter from that monarch inviting trade was received by an English factor as early as 1619. From this time British intercourse with the Burmese assumed some importance, and English factories were established at Syriam, Promé, Ava, and Bhamo. The Burmese conquered Arakan in 1783, and thus found themselves on the frontier of British territory. In 1794 difficulties arose, and an embassy was sent to Ava under Captain M. Symes, who, among other concessions from the Burmese king, obtained permission for English merchants to go to whatever part of the Burman territory they chose, and to buy and sell in security. Disturbed relations on the Arakan frontier commenced in 1811, and ultimately led to the war of 1824. The Burmese invaded English territory, and war was declared 5th March 1824. The treaty of Yandaboo, which ratified peace between the powers, 24th February 1826, provides that the provinces of Arakan and Tenasserim, and the districts of Vey, Tavoy, and Mergui, be ceded to the British. Cruelties towards the British and Americans, and the indignities which the King of Burma continued to heap upon British representatives in the country, led to the declaration of the second war by the British Governor-General, 10th January 1852; and on the 20th December of the same year, Lord Dalhousie's proclamation, announcing the annexation of the provinces of Pegu and Martaban, was published at Rangoon. Sir A. P. Phayre negotiated a treaty with the Burmese Government in 1862, which was revised and confirmed in 1867 between Colonel Fytche and the Burmese king. In terms of this treaty, trade was thrown open to all British subjects, and a commercial court was established at Mandalay, presided over by the British political agent, to decide all commercial questions arising between British subjects. In 1868, Captain E. B. Sladen, British political agent, set out to explore the trade route between Bhamo and Yunnan, and throughout the whole of his outward journey and return was menaced by the agents of the Burmese king, Mendon-Men, who, however, pretended throughout to act in the most

friendly spirit. From that time the king continued for several years to act with the same duplicity, until the mission of Sir Douglas Forsyth to Mandalay secured for Britain the right to send through Burmese territory an armed force sufficient to protect any expedition to Western China for the purpose of surveying the trade route. But nothing was done during the reign of Mendon-Men, and since the accession of Theebaw (September 1878) the complications with the British Government have again become very grave. See Forbes, *B. B. and its People* (Lond. 1878).

Burman is the name of a family noted for a succession of eminent scholars. It belonged originally to Cologne. **Franz B.**, born 1628 at Leyden, whither his father had fled from France, became a Professor of Theology at Utrecht, where he died, 12th November 1679. His eldest son, **Pieter B.**, the most distinguished of all the Burmans, was born at Utrecht, 6th July 1668; studied there and at Leyden, and in 1696 was appointed Professor of History and Rhetoric in the university there, but exchanged this chair for that of Greek Literature and Politics. In 1715 he removed to Leyden as Professor of Rhetoric, and died there, 31st March 1741. His earliest work was *De Vegetabilibus Populi Romani* (Utr. 1694; new ed. 1737). His *Phadri Fabula* (Amst. 1698; Leyd. 1717) was followed by editions of Horace (Utr. 1699), Petronius (Utr. 1709; Amst. 1743), Velleius Paterculus (Leyd. 1719 and 1744), Quintilian (Leyd. 1720), Justin (Leyd. 1722), Valerius Flaccus (Leyd. 1724), Georg. Buchanan (Leyd. 1725), Ovid (Amst. 1727), *Poetæ Minores* (Leyd. 1731), Suetonius (Amst. 1736), his last publication being a quarto edition of Lucan (Leyd. 1740). B. was distinguished by erudition rather than by taste, was irascible and overbearing, and had fierce controversies with several of his learned contemporaries. His son, **Kaspar B.** (born 1696, died 1756), published some legal works. **Franz B.** (born 1671, died 1719) is the author of several theological works in the Dutch language. Of his four sons, two were noted for their science or scholarship. **Johann** (born 1706, died 1779), Professor of Botany at Amsterdam, and author of several works on that subject, and **Pieter** (born 1713, died 1778), who was eminent in philosophy, and who edited many of the Latin classics.

Burn, Richard, born in 1720, at Winton, in Westmoreland. He is known as the compiler of two useful law books, the *Justice of the Peace* and *Ecclesiastical Law*. After being educated at Oxford, he received the living of Orton, in his native county. He held it till his death in 1785.

Burnes, Sir Alexander, an eminent traveller and diplomatist, born at Montrose, 16th May 1805. At an early age he entered the Indian army, in which he eventually became a lieutenant-colonel. In 1832 he was sent on a mission to Central Asia, for which he was peculiarly qualified by his knowledge of Oriental languages. Travelling disguised as an Afghan, he passed through Peshawur and Cabul, Bokhara and Persia, and for his services received public thanks and honours both in India and England. In September 1839, B., now knighted, received the appointment of political agent at Cabul. On the morning of November 2, 1841, a few hours after he had congratulated Sir William Macnaghten, whom he was to succeed as Envoy, on the tranquillity in which he should leave the country, he was murdered, along with his brother, in a sudden insurrection. His *Travels into Bokhara*, and a narrative of his residence at Cabul, published after his death, are works of great interest.

Burnet, applied to two genera of plants, *Sanguisorba* and *Poterium* (natural order *Rosaceæ*, subdivision *Sanguisorbeæ*). *S. officinalis* (the Great B) is common in moist meadows, chiefly in mountainous districts, and found almost all over Europe and Russian Asia to the Arctic circle. It is not recorded from Ireland. The root is astringent, and was formerly used in medicine. In Germany the plant is cultivated for feeding cattle. *P. Sanguisorba* (the salad, common, or garden B.) is found in dry pastures and clefts of limestone rocks in central and southern Europe and temperate Russian Asia, extending into southern Sweden. It is generally spread over the limestone districts of England and Ireland, but is scarce in Scotland. The leaves are slightly astringent, but are used in soups and salads.

Burnet, Gilbert, Bishop of Salisbury, an indefatigable historian and keen politician, was born at Edinburgh, 18th Septem-

her 1643. He belonged to an old Aberdeenshire family, and was educated at Marischal College, Aberdeen, where he applied himself with great zeal to study, particularly the study of theology. After travelling in England and on the Continent, he returned to Scotland, held the living of Saltoun for a few years, and in 1669, at the age of twenty-six, was appointed to the Professorship of Divinity in the University of Glasgow. Actively opposing the policy of Sharpe and Lauderdale, B. found it advisable to resign his chair in 1674, and removed to London, where he acquired a considerable reputation both as a preacher and as a politician. He narrowly escaped being involved in the Ryehouse Plot, and conducted the defence and attended the execution of Lord William Russell. On the accession of James II. he retired to the Continent. He became the trusted friend of William of Orange, accompanied him to England as chaplain, and was made Bishop of Salisbury. He continued a great favourite with the King, and in 1698 was appointed preceptor to the Duke of Gloucester, son of the Princess (afterwards Queen) Anne. His life was not without troubles. His first pastoral letter as bishop was burnt by order of both Houses of Parliament, because in it he founded the right of William to the throne on conquest; and an exposition by him of the Thirty-nine Articles was declared to be heterodox by the House of Lords. He died, 17th March 1715, of pleuritic fever, in his seventy-second year. B., who was thrice married, was a hearty, genial, strictly virtuous and religious, and in spite of certain passionate outbursts essentially prudent Scotchman. He wrote many works of history and biography, of which the most valuable are his *History of the Reformation*, the first volume of which appeared in 1679, and his posthumous *History of My Own Time, from the Restoration of King Charles II. to the Conclusion of the Treaty of Peace at Utrecht in the Reign of Queen Anne*. His style is not very elegant, and sometimes dry, but it is vigorous and never extravagant, and he has an almost Boswellian power of massing details of fact and even of gossip, and thus of producing accurate historical portraits. Macaulay, in his *History of England*, vindicates and extols B., who was unfairly ridiculed by the wits of his time.

Burnet, John, a Scotch painter and engraver of considerable merit, was born at Fishrow, near Edinburgh, March 1784. He is the author of several works on painters and painting, of which *Rembrandt and his Works* (1849), and a *Practical Treatise on Painting*, are the chief, but he is best known for his admirably-executed engravings of the works of Wilkie.

Burnet, Thomas, philosopher and divine, was born at Crest, in Yorkshire, in 1635. He was educated at Cambridge, and, after acting as travelling tutor to the sons of several noblemen, became, in 1685, Master of the Charterhouse—where he distinguished himself chiefly by opposing the arrogation of the dispensing power by James II.—and subsequently clerk to the closet and chaplain to King William. From this latter post he was compelled to retire by the publication of his views on the Mosaic account of the Fall. B. died 27th September 1715. His *Telluris Theoria Sacra* (published in Latin in 1680, in English in 1691) is the work with which his name will be permanently associated. It is an ingenious but extravagant speculation, full of eloquent passages—those on the Flood and the final burning of the earth being especially admired.

Burnett Prizes, The. were founded by Mr. B., of Dens, Aberdeenshire, who was born in 1729, and after a prosperous career as a merchant in Aberdeen, died in 1784. He left his fortune partly for charitable purposes and partly for these prizes. The prize fund was to accumulate for forty years at a time, and two prizes, not less than £1200 and £400, were to be offered for the two best essays on 'The evidence that there is a Being all-powerful, wise, and good,' and to 'obviate difficulties regarding the wisdom and goodness of the Deity, without reference to revelation.' The competition is open to the world, and the judges are three persons appointed by the trustees of the testator, together with the ministers of the Established Church in Aberdeen, and the Principal and Professors of Aberdeen University. In 1815, at the first competition, fifty essays were sent in. Dr W. Lawrence Brown, Principal of Marischal College, Aberdeen, gained the first prize of £1200 for an essay on the *Existence of a Supreme Creator*. The second prize of £400 was awarded to the Rev. John Bird Sumner, afterwards Archbishop of Canter-

bury, for an essay on the *Records of Creation*. The second competition took place in 1855, when the formidable number of 208 essays were presented. The judges were the Rev. Baden Powell, Mr Henry Rogers, and Mr Isaac Taylor. The first prize of £1800 was won by the Rev. Robert Anchor Thompson, Lincolnshire, whose essay was entitled *Christian Theism*; the second prize of £600, by the Rev. John Tulloch, Principal of St Mary's College, St Andrews, whose essay was entitled *Theism*. All these essays were published. It is said that £10,000 will be available in 1895.

Burnett's Disinfecting Fluid, a liquid antiseptic and deodoriser, prepared from zinc chloride, and introduced by Sir William Burnett. It acts on sewage and other decomposing animal matter by decomposing the ammonium sulphide which evolves the offensive gas, and forming ammonium chloride and zinc sulphide, both of which are odourless and innocuous. B.'s F. is not now in much use, as other antiseptics and deodorisers have taken its place.

Burney, Dr Charles, an eminent musical composer, was born at Shrewsbury, 1726, studied music under Dr Arne, and worked as a music-teacher and composer in London and elsewhere. He became organist to Chelsea Hospital in 1789, and died 15th April 1814. B.'s compositions are not now heard of, but his memory lives in connection with his *General History of Music from the Earliest Ages to the Present Period*, upon which he spent great labour, and which long remained the standard work upon its own subject. B. also wrote a Life of Handel, and several other works.

Burn'ing Glasses and Mirrors. See LENS and MIRROR.

Burnley, a town in the E. of Lancashire, on the Burn, a branch of the Calder, 24 miles N. of Manchester, and a station on the London and North-Western Railway, also connected by a branch from Todmorden with the Yorkshire and Lancashire railways. It has woollen and cotton factories, calico-printing works, iron and brass foundries, machine-making works, breweries, tanneries, and rope-works. There is a plentiful supply of water, and coal is abundant in the neighbourhood. A Roman road passed through B., and numerous Roman relics have been found in the vicinity. Pop. (1871) 40,858.

Burnouf, Eugene, a noted French Orientalist, was born at Paris, 12th August 1801. He devoted himself to the study of Eastern languages, and produced in 1826 an *Essai sur le Pali*. B.'s high place among Oriental scholars, however, was gained by his rediscovering the meaning of the Zend, or ancient Persian language, the key to which had been lost. Certain MSS. in that tongue, brought to Paris by Anquetil Duperron, lay in the *Bibliothèque Royale*, and these B. deciphered by intense labour and a fine critical acumen. In 1830 he began by publishing the Zend text of the *Vendidad-Sadé* of Zoroaster, accompanied by a Sanskrit glossary, and in the *Journal Asiatique* he afterwards gave to the world the fruits of his invaluable investigations. In 1834 appeared the first volume of the *Commentaires sur le Yagna, l'un des Livres Liturgiques des Perses*. This work illustrated the language, no less than the tenets, of Zoroaster. B.'s knowledge of Sanskrit was shown by his edition of the *Bhagavata-Purana*, or *Histoire Poétique de Krishna*, and he wrote also on cuneiform inscriptions. His *Introduction à l'Histoire du Bouddhisme* appeared in 1845. The materials for this great work were furnished by an Englishman, Mr Brian Hodgson. In it B. explains the dogmas and the origin of Buddhism. It is still the greatest work on the subject. (See BUDDHISM.) He died 28th May 1852, in the prime of life, having won a world-wide reputation.

Burns, Rev. Jabez, D.D., a noted Baptist preacher and author, was born in 1805, at Oldham, near Manchester. He removed to London in 1826, where he began to preach in 1835, and soon acquired and retained a great celebrity in his denomination. B. died 1st February 1876. He was a prolific writer. Among his works may be mentioned *Sketches and Skeletons of Sermons*, *Christian Philosophy*, *Deathbed Triumphs*, *Missionary Enterprises*, and *Christian Exercises for every Lord's Day in the Year*.

Burns, Robert, was born January 25, 1759, in a cottage near Ayr. From his father, who, although originally only a nursery-

gardener, and never rising beyond the position of a small farmer, was a man of strong intelligence as well as sterling worth, he obtained an education considerably above that of the ordinary peasant's son, and which was sufficient to open to him the gates of miscellaneous reading. He read poetry greedily, and began to compose verses in the Scotch dialect at an early age. These attracted notice in the district in which he lived, and gained him many friends, some of whom, by the convivial excesses to which they allured him, did him more harm than good, and he fell in more ways than one from the path of rectitude in which he had been trained to walk by his father. A farming venture which he tried in 1781, with his brother Gilbert, at Mossiel, near Mauchline, failed; he became embittered and embarrassed by the results of a *liaison*, which seems, however, to have been in reality a Scotch marriage, with Jean Armour, the 'Bonny Jean' of his poetry; and he was on the point of emigrating to Jamaica, when the favourable reception accorded to a collection of his poems, which he had published (1786) in Kilmarnock to defray the expenses of his passage, induced him to remain in this country, and he went to Edinburgh to superintend a new edition of his poems. For a brief period he was the lion of fashionable and literary society there, and astonished all who met him by the vigour of his intellect and the brilliancy of his conversation. Realising a considerable sum from the new edition of his works, he once more took a farm (in 1788) at Ellisland, near Dumfries, and settled there with Jean Armour, whom he had now publicly married. He united to the farm the office of exciseman, and when the former failed him, he removed to the town of Dumfries as an officer of excise on a salary of £50, which never rose above £70; and at no time did B.'s income, including perquisites, exceed £90. His ardent, liberty-loving spirit caught fire at the time of the French Revolution, and some indiscreet speeches and actions, which were construed as evidence of his holding Jacobinical opinions, being reported to the Board of Excise, he seems to have been verbally threatened with dismissal, and his promotion to have been delayed. Recent investigations, however, show that no censure was ever recorded against him in the books of the Excise Board, and that, had he lived a few months longer than he did, he would have been promoted to a superintendency, which would have doubled his income. B. was, however, shunned by the 'better' classes in Dumfries, chiefly on account of his supposed opinions. There can be no doubt that his proud and sensitive soul was deeply wounded. He gave way now and then to a constitutional melancholy; and although he always attended regularly to his duties, and never became in any sense whatever a drunkard, he injured his health by imprudent excesses. Broken in health and in spirits, but with his muse active to the last, the great poet died in Dumfries, July 21, 1796.

The greatest of Scottish poets, B. is distinguished by variety as well as by intensity of power, and unites the most blithe, brilliant, and wanton humour with the noblest fervour and the softest pathos. He is not a rough, careless versifier. When using the Scottish dialect he displays an almost Shakespearian felicity of language. As a popular lyricist he is unrivalled; compared to him even Beranger rings somewhat thin and unsatisfying. His songs, burning and trembling with the sincerest passion—free both from crudeness and from the weakness of elaboration—move to faultless music, and breathe and bloom with the freshest and loveliest imagery. On Scotchmen, at least, they bestow a pleasure at once stronger and sweeter than can be derived from any other author in the wide realm of literature.

B.'s works have passed through innumerable editions in Britain, the Colonies, and America, the best-known being those of Currie, Allan Cunningham, R. Chambers, and Hately Waddell. M'Kie (Kilmarnock) has published a *facsimile* of the first, or 1786 edition, and, under the title of *Burnsiana*, a singularly complete account of the extensive literature to which the poems of B. have given birth. In 1859 the centenary of his birth was celebrated all over the world with great enthusiasm; and there is scarcely a community of Scotsmen in the world that has not its 'B. Club,' which, on the 25th of January every year, toasts the 'immortal memory' of the poet in orations which are fast becoming a public nuisance.

Burns and Scalds are injuries produced by heat to the tissues of the body. When by a solid, it is called a burn, and by

a fluid, a scald. The danger due to B. or S. varies with the amount of surface injured, the depth to which the burn or scald has penetrated, the importance of the part affected, and the age and constitution of the patient. B. and S. are very dangerous in very young or very old people. Inflammation of internal organs is a serious consequence of many B. and S. The symptoms vary with the degree of injury. The chief are shock, sometimes fatal; rapid and weak pulse, and often severe pain. **Treatment.**—When exhaustion and faintness come on, give brandy and other stimulants; when there is great pain, opium will often give relief; and in very bad cases the patient may with great advantage be put under the influence of chloroform till the wounds are dressed, or even for some days he may be kept under the influence of chloroform if necessary. **Local treatment** consists in excluding the air. This may be accomplished sometimes by immersing a limb in cold water. Ice to the part often does good. Carron-oil, which consists of equal quantities of olive-oil and lime-water well shaken together, forms a most soothing application. It receives its name from the Carron Ironworks, near Falkirk, where it is extensively used by those who work amongst molten metal. After the application of Carron-oil, the part is to be covered with cotton-wadding, and a gentle bandage is to be applied. The patient should be kept in as easy position as possible. When a blister forms, it is to be pricked, but the loose skin is not to be removed. Care must be taken to prevent deformity by the contraction of the parts, so common during the healing of B. and S.

Burntisland, a seaport and summer watering-place in Fife-shire, on the Firth of Forth, 8 miles N. of Edinburgh. As a station of the Edinburgh, Perth, and Dundee Railway, it is connected by a steamboat ferry with Granton on the S. side of the Firth. There is a harbour, which is (1876) being much enlarged and improved; the trade is chiefly coal and iron shipping and distilling. B. unites with Kinghorn, Dysart, and Kirkcaldy to send a member to Parliament. It is an old place, originally under the Abbots of Dunfermline, and was made a royal burgh in 1568. Pop. (1871) 3422.

Burnt-Off'ering, one of the forms—indeed, the chief form—in which the ancient sacrifices were made. (See SACRIFICE.) Flame and smoke, in which the offering was consumed, was the means by which the sacrifice was conveyed to the deity, or the offering wafted to heaven. The sacrifice known specially as the B.-O. in the Mosaic law (Lev. i.) consisted of the slaying of a male victim, which was entirely consumed by fire, and was intended to make atonement for sins in general.

Burnt Sienn'a, a fine chestnut-brown pigment obtained by burning an ochreous mineral called *Terra di Sienna*, and very useful in oil or water-colour painting.

Burnt Stones, a name given to ancient imitations of the sardonyx, made by burning carnelians or sards with a red-hot iron plate, thereby imparting a white opacity to a thin layer of the translucent gems. They were highly valued among the Romans for gem-cutting.

Burnt Um'ber, a reddish-brown pigment prepared by burning an earthy ore of iron and manganese, first obtained at Umbria, in Italy. It is permanent, and mixes well with other pigments.

Burr, Aaron, third Vice-President of the United States, was born at Newark, New Jersey, February 6, 1756. He was a grandson of Jonathan Edwards. After studying at Princeton, he entered the Revolutionary army, but siding with the faction opposed to Washington, he was compelled to leave headquarters. In 1782 he began the practice of law in Albany, was made Attorney-General of New York in 1789, and United States senator in 1791. B. now became a leader of the Democratic party, and was made Vice-President, 1801, Jefferson being President. A bitter contest for the governorship of New York, in which he was defeated, led to the notorious duel with Alexander Hamilton (July 11, 1804), in which the latter was mortally wounded. B. next entered into a reckless scheme for the establishment of an empire in the S.W., including Mexico. He was apprehended, and tried for treason in Richmond in 1807, and though acquitted, never regained his former influence. He died at Staten Island, September 14, 1836.

Burria'na, a town of Spain, province of Castellon, on the Rio Seco, 8 miles S. of Castellon. It has exports of wine and fruit. Pop. 6200.

Burri'saul, a town of India, province of Bengal, executive district of Backerganj, on the Gangetic delta, 120 miles W. of Calcutta. Pop. (1871) 7684.

Burr'itt, Elihu, popularly known as the 'Learned Blacksmith,' was born in New Britain, Connecticut, U.S., December 8, 1811. He was the son of a shoemaker, and after receiving a common school education, was at the age of sixteen apprenticed to a blacksmith. Subsequently he removed to the town of Worcester, Massachusetts, and studied a great variety of ancient and modern languages while working at his trade. In 1844 he became an editor of a paper, and in 1846 came to England, where his fame as a linguist secured him much attention. B. returned to America in 1853, and took much interest in moral reforms and popular improvements, such as anti-slavery, temperance, peace, and cheap postage. B.'s works, of which the best known are *Sparks from the Anvil* and *A Voice from the Forge*, are not equal to his reputation. During his later years he lived in New Britain, teaching Sanskrit. He died 7th March 1879.

Burr'um, a town of India, N.W. Province, executive district of Boolundshuhur, about 40 miles N.W. of Delhi. Pop. (1871) 15,284.

Bursary (Lat. *bursa*, Fr. *bourse*, Ital. *borsa*, Eng. *purse*, from the Gr. *byrsa*, a hide, purses being usually made of leather), a word that arose with the institution of universities in the second half of the middle ages, and meant the money applied to the gratuitous boarding, lodging, and educating of poor students in common, under the supervision of the Principal and teachers of the university. The term is not used in the English universities, but the treasurers of colleges and halls are called bursars. Each of the four Scottish universities has numerous bursaries, which are generally the proceeds of capital and mortified sums, or of landed or other property bequeathed to furnish stipends for deserving students. There are presentation bursaries, but the rule is, since 1831, to award them by competition. They are for the most part of small value, but they have done much to promote the higher education in Scotland. The University Commissioners of 1863 recommended that several of the smaller bursaries should be consolidated into one, and otherwise gave valuable practical suggestions as to the mode of bestowing them, which have been to a great degree carried out. In St Andrew's, the number of bursaries attached to the United College is 81, varying in value from £5 to £50; the number belonging to St Mary's College (theological) is 20, in value from £6 to £50 per annum. The United College possesses 5 scholarships—2 of £50, tenable for four years; 2 of £50, tenable for two years; and 1 tenable for four years, value for the first year £100, and £50 for each of the three following years. The proceeds annually available for bursaries, prizes, and scholarships average about £2000. In Glasgow, the income of trust funds for scholarships, bursaries, and prizes from all sources, including the estate managed by Balliol College, Oxford, for the Snell Exhibitions, amounts to £6175, 15s. 11d. The bursaries, about 142 in number, range in value from £5 to £100, and the average value is fully £21. The Snell Exhibitions to Balliol College are 14 in number, of the value of £110, and tenable for five years. There are about 20 other scholarships or fellowships, in value from £30 to £200—4 founded in 1872 by George A. Clark of Paisley amounting to £200 each. In Aberdeen there are 250 bursaries, of which 223 are attached to the Faculty of Arts, and 27 to that of Theology. They vary from £5 to £50, and average fully £17 each, the total sum divisible being £4390, 6s. There are also 11 scholarships, of from £65 to £70 per annum, and several exhibitions to Cambridge. Edinburgh has 111 bursaries in the Faculty of Arts, 30 in Theology, 9 in Law, and 12 in Medicine—in all, 162. It has 37 scholarships in the Arts, and 8 fellowships—the Swiney Lectureship in Geology being reckoned one of these. The Ferguson scholarships, and the Scottish University classical scholarships, are open for competition to the graduates of the four universities. Bursaries are generally tenable for four years, the period embraced in the Arts course. Considerable diversity of opinion exists as to the utility of bursaries. They are said to act as temptations to unsuitable persons to devote themselves to a learned profession; on the other hand, they have often furnished

the supplement necessary to enable deserving youths to procure for themselves an otherwise unattainable education. The number of bursaries is being continually increased. The term B. survives in Germany under the form *Bursch*, which means either an apprentice bound to any trade, or (what is more familiar to our ears) a university student; but all idea of stipend has been eliminated from the word.

Bur'slem, a town in the N. of Staffordshire, and a station on the North Staffordshire Railway system, about 17 miles N. of Stafford. It lies on the Grand Trunk Canal, connecting the Trent and the Mersey, and now forms part of the parliamentary borough of Stoke-on-Trent. B. has long been famous for its earthenware. It is called the 'Mother of the Potteries,' and produces in great perfection porcelain, parian, white and black ware, lustre, encaustic tiles, &c. B. is supplied with excellent water by the Staffordshire Potteries Waterworks Company. A new town-hall was built (1865), containing lecture-rooms and news rooms, and a new covered vegetable market (1878) at a cost of £25,000; the Wedgwood Memorial Institute supplies a school of art, a free library, and a museum. Josiah Wedgwood, the great improver of pottery manufacture in last century, was a native of B. The town is very old, and appears in *Domesday Book* as *Burcardeslēm*. Pop. (1871) 25,562.

Bur'ton, John Hill, LL.D., a well-known Scottish historian, was born at Aberdeen, August 22, 1809. Having graduated at Marischal College, he came to Edinburgh, and passed at the Scottish bar in 1831. For many years he was a regular contributor to the *Westminster* and *Edinburgh Reviews*, and to *Blackwood's Magazine*. In the department of law and political economy, he has written a work on *Political and Social Economy* (1849), *Narratives from Criminal Trials in Scotland*, *Manual of Scottish Law*, and a *Treatise on the Scottish Bankruptcy Law*. He was also co-editor with Sir John Bowring of the works of Bentham, and he prepared a volume of extracts from these works, issued under the title *Benthamiana*. Among the lighter productions of his pen are *The Scot Abroad*, *The Book-Hunter*, and the *Cairngorm Mountain* (1864). B. has also published *The Life and Correspondence of David Hume* (1846), *Lives of Simon Lord Lovat, and Duncan Forbes of Culloden* (1847), and a *History of Scotland from the Revolution to the Extinction of the last Jacobite Rebellion* (1853). His magnum opus, however, is his *History of Scotland from the Earliest Period to the Revolution of 1688*, which at once took its place as the standard work on the subject. In 1854, B. was appointed Secretary to the Prison Board of Scotland by Lord Aberdeen's Government.

Bur'ton, Richard Francis, traveller and author, is the son of Lieut.-Colonel J. N. B., of Tuam, Galway, and was born in 1821. Entering the Indian army in 1842, he served under Sir Charles J. Napier, and became a captain in 1857. B. is chiefly famous for his daring as a traveller. He endeavoured to explore Arabia in the guise of an Afghan pilgrim, and nothing could be more remarkable than his adventures, as described in the account then published (1855) under the title of *Personal Narrative of a Pilgrimage to El Medinah and Meccah*. Along with Lieutenant Speke, he penetrated into the region of the Upper Nile, in Africa, and discovered and explored the great Lake Tanganyika, for which he was rewarded with the medal of the Royal Geographical Society. Since then, B. has visited North America, the Moimon country, and Iceland, has been consul at Fernando Po, visiting the Cameroon Mountains and the King of Dahomey, at Santos in Brazil, and finally at Trieste, where he succeeded the late Mr Charles Lever. B., who is understood to be a most accomplished swordsman, shot, hunter, and linguist, has published books descriptive of his various travels and adventures. Among the chief may be mentioned *The Lake Regions of Central Africa* (1860); *The City of the Saints* (1861); *Abokuta, or the Cameroon Mountains* (1863); *Zanzibar, City, Island, and Coast* (1872); *Ultima Thule, A Summer in Iceland* (Lond. 1875), and *Two Trips to Gorilla Country* (Lond. 1876).

Bur'ton, Robert, author of *The Anatomy of Melancholy*, was born at Lindley, in Leicestershire, 8th February 1576, and studied at Oxford. He became vicar of St Thomas, Oxford (1616), and rector of Seagrave, Leicestershire, but resided chiefly at Christ Church. His famous book, 'by Democritus Junior,' appeared in 1621, and for some time enjoyed a popularity which declined after the author's death, to be revived in our own time.

During the period of its obscurity, it was freely laid under contribution by plagiarists; among numerous others, by Sterne. The work was composed that the author might be able to drive away melancholy by busy occupation. It is a marvellous repository of quotations, drawn from obscure authors, composed in a rough style, displaying much curious learning, and lighted up at times by quaint and humorous turns of thought and expression. B. died 25th January 1639. The Roxburghe Club published his *Philosophaster* and *Poemata* in 1862. B. had an elder brother, William (born 1575, died 1645), who obtained a reputation as an antiquary. His chief work is a *Description of Leicestershire* (1622).

Burton upon Trent, a town of Staffordshire, on the Trent, and a station on the Midland Railway, 24 miles N.E. of Stafford. A bridge of thirty-two arches across the Trent at B. replaced in 1864 one of thirty-six arches which was said to have stood since before the Norman conquest. Brewing ale is the staple trade. It began about the year 1700, and has now attained an enormous development. There are upwards of twenty breweries, but those of Bass and Allsopp are among the largest in the world. There are also large cooperages and some iron foundries. A fine church costing £36,000 was erected here by Mr. T. Bass (1874), and a new post office built (1877) at a cost of £7000. Pop. (1871) 20,378.

Burtscheid, a town of Rhenish Prussia, close by Aix-la-Chapelle, celebrated for its sulphurous springs (temp. 106°-155° F.). It has also ten cloth factories, engaging 1900 hands, and was formerly the seat of an abbey founded in 737 A.D. Pop. (1871) 10,081.

Buru, one of the Molucca Islands, lying E. of Celebes. Its greatest length from N. to S. is 50 miles, from E. to W. 90 miles; its area is estimated at 2500 sq. miles, and its pop. at nearly 20,000. The country is mountainous but fertile, producing, among other produce characteristic of these regions, cajuput oil, rice, sago, dyes, and aromatic woods. On the N.E. coast is the fine sheltered Cajeli Bay, on the S. shore of which lies the Dutch station, Fort Defence.

Burujird, or **Burujard**, a town of Persia, province of Irak-Ajemi, 190 miles N.W. of Isfahan. The plain on which it stands yields such excellent pasturage that there are always some Persian cavalry stationed here. B. has manufactures of carpets, and a trade in dried fruits and treacle of grapes. Pop. about 12,000.

Bur'wha, a walled town of Bornu, Central Africa, on the west shore of Lake Tchad, 80 miles N.N.W. of Kuka. The sole article of commerce is fish, which also forms the chief food. Pop. about 6000.

Bury, a manufacturing town of Lancashire, on the Irwell and Roche, 9 miles N.W. of Manchester, and a station on the Lancashire and Yorkshire Railway. It was at first a seat of the woollen manufacture, introduced here in the reign of Edward III. by Flemish weavers, and this is still largely carried on. But its great staple now is cotton-spinning. There are also extensive printing, bleaching, and dye works, paper-mills, and some iron foundries. The district abounds with coal-mines and freestone quarries. An ample supply of water has recently been brought into B., and an infirmary was erected (1874) at a cost of £6800. Pop. (1871) 41,344. The late Sir Robert Peel was born here, and there is a bronze statue of him in the old market-place. North of the town lies Chamber Hall, the property of the Peels.

Burying Bee (*Necrophorus*), a genus of *Coloptera*, belonging to the section *Pentamera*, and to the family *Silphidae*. The antennæ are short and club-shaped. These beetles derive their familiar name from their habit of burying dead animals or pieces of carrion in the earth, to afford a store of food for their larvæ. In some cases several beetles may thus unite to cover or bury animals (such as mice and small birds) many times exceeding their own size. These beetles occur in Britain, the *N. Vespillo* being the best-known native form, whilst other species inhabit N. America and elsewhere. The *N. Vespillo* averages an inch in length, and is marked across the back by two orange bands. It exhales a persistent and fetid odour. These beetles excavate the earth around their prey by means of their head, assisted by

the feet. The larvæ, produced from eggs deposited within the carrion, possess six feet, and are whitish grubs with brown heads. Another species, resembling the *B. B.* in habits, is the four-spotted carrion beetle (*Silpha quadripunctata*).

Bury St. Edmunds, a parliamentary borough and market-town in Suffolk, on the Upper Larke, 26 miles N.W. of Ipswich, and a station on the Great Eastern and Eastern Union Railway. It has no manufactures, but a trade in corn, cheese, butter, and wool. By an excellent system of drainage, the sewage is conveyed to a distance, and there it is raised by pumps to irrigate the land. In 1862, a new corn-exchange was erected, and the Suffolk General Hospital was rebuilt in 1864. The borough has returned two members to Parliament since the time of James I. Pop. (1871) 14,928. B. is a place of very great antiquity. Relics of the Roman period are abundant. Roman bricks and tiles were used in the building of its famous abbey. In earliest English times it was called *Beodricsworth* ('Beodric's house'), but received its present name in honour of the East Anglian under-king Eadmund, who was murdered by the Danes in 870, and whose ashes were interred here in 903. King Ethelstan erected a church to his memory in 925. On the site of his tomb a monastery was founded by six priests, and connected with it Canute raised a magnificent abbey, only surpassed in privilege by that of Glastonbury. The abbot was mired, and sat in Parliament; he had the power of inflicting capital punishment, and the privilege of coining. The worries that the abbots of B. had in old times with obdurate burgesses are picturesquely sketched in Carlyle's *Past and Present*. The grammar-school of B. was founded by Edward VI. in 1550, and is free to the sons of inhabitants. It was at B. that the barons assembled (1214) and swore to defend the laws and liberties of England. Parliaments were held here in 1272, 1296, 1446, and sovereigns were often royally entertained in the abbey.

Busa'co, a mountain ridge in the province of Beira, Portugal, an offset from the Serra de Alcoba, about 20 miles N.N.E. of Coimbra. On its summit is a convent, near which, on September 27, 1810, Wellington repulsed the French under Massena, who had attempted to force his position, and continued his retreat to the lines of Torres Vedras.

Busaquin'o, a town in the province of Palermo, Sicily, 29 miles S.S.W. of the city of Palermo, has linen manufactures. Pop. 8100.

Bus'by, Richard, D.D., a schoolmaster whose merits cannot possibly have excelled his fame, was born at Luton, Northamptonshire, September 22, 1606, educated at Westminster School, and Christ Church, Oxford, and head-master of Westminster from 1640 till his death, 6th April 1695. He saw sixteen of his old pupils raised to the bench of bishops. His success was due to his learning, zeal, and rigorous application of the rod, which he used to call his 'sieve,' as 'whoever did not pass through it was no boy for him.'

Bus'ca, a town of Piedmont, on the Maira, a tributary of the Po, 9 miles N.N.W. of Coni. The neighbourhood produces good wines. Pop. 9375.

Busch'ing, Anton Friedrich, one of the first geographers who supplied statistical information regarding the countries he described, was born at Stadthagen, in Schaumburg Lippe, September 27, 1724. He was appointed Extraordinary Professor of Philosophy at Göttingen in 1754, the year in which the first volume of his great work *Erdbeschreibung* was published at Hamburg. In 1761, B. accepted an invitation to St Petersburg as a Protestant preacher, but returning to Germany in 1765, he was appointed Director of the Gymnasium of the *Grauen Kloster*, in Berlin, the following year, where he died, May 28, 1793. B.'s *Erdbeschreibung* extended to 11 vols., and was not completed till 1792.

Bu'senbaum, Hermann, a Jesuit theologian, born in 1600, at Nottelen, Westphalia, and died 31st January 1668. His *Medulla Theologiæ Moralæ* (Münster, 1645), a standard authority with his order, has passed through more than fifty editions. An enlarged edition, with commentaries, by P. Lacroix and Collendall, appeared in 1707. It was republished at Lyon in 1729, with further additions by P. Montausan, and again at Rome in 1757, by the Jesuit, Alfonso de Ligorio. It was

condemned by the Parliaments of Paris and Toulouse, as it was discovered that it declared regicide to be lawful. A defence of B., by P. Zacharia, was publicly burned, 10th March 1758. A new defence, by P. Angelo Franzoja, appeared at Bologna, 1760.

Bush Antelope, or **Bush Buck** (*Antilope* or *Cephalophus ruficollis*), the name of a solitary species of antelope, found chiefly in Sierra Leone, inhabiting the mountainous plateaux; but this term is also applied popularly to other species. The B. A. above alluded to, and which is the form most commonly denoted by this name, attains a height of about three feet at the shoulders. Its colour is brown, and streaked with fawn or light-yellow on the hinder part of the back; and from this latter peculiarity the name of 'white-backed' B. A. has been applied to this species. It is a timid species, lying concealed in thickets by day, and feeding in twilight or at dusk. Its flesh is highly esteemed, but is said at certain times to possess a musky odour. The legs are shorter and thicker than in most other antelopes. The other species of the genus *Cephalophus* usually possess horns in the male sex only, and the forehead is furnished with a tuft of hair. The pigmy antelope or blue buck (*C. pygmaus*) of S. Africa, 12 inches high, is nearly allied to the B. A.

Bushab' (properly *Khoshaub*, 'good water'), a long, narrow, and low, but well-peopled island in the Persian Gulf, 212 miles S. W. of Abushir. It has a harbour and town at its west end.

Bushel, an English measure of capacity for dry materials, containing eight gallons.

Bushire'. See ABUSHEHR.

Bushman Language, a form of the so-called 'click-language,' spoken by the Bushmen or Bosjesmen (q. v.) of S. Africa. It is of scientific interest mainly as an aboriginal tongue, and as a rich repository of native legend and folklore. Phonetically it is most repellant, comprising deep gutturals and a great variety of clicks, uttered with a sharp nasal twang. The late Dr W. H. J. Bleek, curator of Grey Museum, Cape Town, has collected almost all that is yet known of the B. L. in his still unpublished *B. Grammar and Dictionary*, and his *Brief Account of B. Folklore and other Texts* (1875).

Bush'nell, **Horace**, was born in New Preston, Connecticut, in 1802, graduated at Yale College, 1827, and was for a time editor of a newspaper, but was ordained minister of a Congregationalist church in Hartford, Connecticut, in 1833. He resigned in 1858. B. early became famous both as a thinker and speaker. In 1847 he published *Christian Nature*; in 1849, *God in Christ*, for which he was tried for heresy, but acquitted; in 1851, *Christ in History*; in 1858, *Nature and the Supernatural*; and since then, *Sacrifice, Law, and Forgiveness*, and other works. B. was one of the most subtle thinkers and able theologians of New England. He died at Hartford, Feb. 17, 1876.

Bus'kin (*L. colturnus*), a high-heeled shoe worn by ancient actors in tragedy, hence used figuratively for tragedy, as the sock (*soccus*) for comedy. Thus Milton speaks of the 'buskin'd,' i. e., the tragic, stage; thus, also, in the *Return from Par-nassus*—

'Marlowe was happy in his buskin'd muse.'

Bussahir', or **Bassahir'**, a native state of Northern India, in feudal subordination to the Punjab Government. It lies on the southern flank of the Himalayas, and is traversed from E. to W. by the Sutlej. B. has all varieties of climate and vegetation, from subtropical to frigid. The country seems to be rich in minerals, copper ore especially being abundant. Its area is estimated at 2560 sq. miles, and its pop. at 55,000, and the revenue at nearly £7000. The rajah, who is a Rajput, pays an annual tribute of £394, 10s.

Busseerhat', a town of India, province of Bengal, in one of the 24 pergunnahs division, has a pop. (1871) of 12,105.

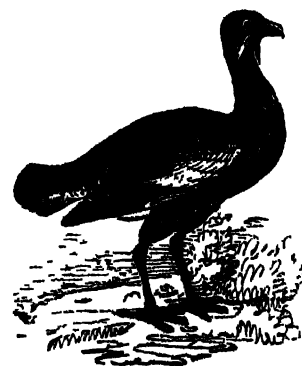
Bussu Palm (*Manicaria saccifera*), a native of the tidal swamps of the Amazon river. Of the leaves of this, as of many other palms, thatch is formed. Bags are made of the entire spathe, and the larger ones are stretched to form a material out of which caps are manufactured.

Bust (Ital. and Span. *busto*, Fr. *buste*), in sculpture, is a statue truncated below the breast. In Latin *bustum* signifies the reverse—the trunk of the body without the head. The ancient

Hermæ were heads (originally of Mercury) placed on a four-sided pillar. Though perhaps the origin of the B., they are not identical with it—the modern B. including shoulders, breast, and the upper part of the arms. Portrait busts do not appear in Greece till Alexander's time; those of Rome afford faithful likenesses of the emperors and great men of the city. England has excelled in this branch of sculpture, Chantrey being especially famous for his skill in it. The greatest modern collection of busts is that formed by King Louis of Bavaria; engravings of ancient ones are given in Visconti's *Iconographie Grecque* (Par. 1811) and *Iconographie Romaine* (1817).

Bustard (*Otis*), a genus of *Grallatorial* or Wading birds, included in the family *Otidæ*, in which the bill is short and

stout, convex, and broad at the base; the nostrils placed in a membranous groove, feathered at its upper portion; the legs long and slender, the toes short, and provided with convex claws, and the hinder toe absent. The wings are powerful, and of pointed conformation, and the tail is elongated. These birds differ in many points from ordinary waders, chiefly in the shape of the bill and in habits. They are closely allied on the one hand to the *Cursores* (q. v.), and on the other to the *Rasores* (q. v.). They inhabit the Old World, and chiefly live in heaths and dry plains. They feed on



Bustard.

worms, insects, reptiles, and even small mammals, and also eat vegetable matters. The Great B. (*Otis tarda*), formerly abundant in Wilts and Norfolk, is now comparatively rare in Britain, but occurs in S. and E. Europe, and in Central Asia. The male measures from 3 to 4 feet in length, and the female 3 feet, the former sometimes weighing 30 lbs. or more. The young birds are considered good eating. The upper parts are of chestnut colour varied with black; the wings being black and white, and the tail tipped with the latter colour. The chin of the male in summer bears underneath, and on each side, a tufted plume about 6 or 7 inches in length, this plume covering a bare portion of skin on each side of the head and neck. No gular pouch (such as exists in the pelicans), formerly described as present in the males of these birds, exists. These birds are polygamous, and are readily tamed, but do not appear to breed in a domesticated state. The Little B. (*O. tetrax*) inhabits the borders of the Mediterranean Sea, but occasionally visits Britain. Its average length is 17 inches. Other species are the *O. caeruleus* of Africa, and the S. African Kori (*O. kori*), the Australian B. (*O. Australasianus*), and the Asiatic or black-headed B. (*O. nigricaps*), found chiefly in the Mahratta plains, and highly esteemed in India.

Busto-Arsizio, a trading town of N. Italy, province of Milan, 20 miles N.W. of the city of Milan, has several fine churches, with remains of several ancient buildings. Some cotton manufactures are now carried on. Pop. about 10,000.

But'ala, a town of India, province of the Punjab, executive district of Gurdaspur, has a pop. (1868) of 28,725.

Butcher-Bird. See SHRIKE.

Butcher's Broom (*Ruscus*), a genus of plants belonging to the natural order *Liliaceæ*. *R. aculeatus*, the common B. B., is a shrubby evergreen plant remarkable for the flowers being formed on leaf-like branches (*Cladodia*, q. v.). It derives its name from butchers using it to sweep their blocks. The roots are aperient and diuretic, and at one time were much used in diseases of the bowels. The roasted seeds have been used as one of the many substitutes for coffee.

Bute, an island in the Firth of Clyde, Scotland, separated from Argyllshire by the Kyles of B., a picturesque winding channel less than a mile in width. It is 5 miles from the Ayr-

shire coast, and 6 miles N.E. of Arran. B. is 18 miles long, and from 3 to 5 broad, with a pop (1871) of 10,064. Nowhere does it rise to a great elevation, and much of it, especially in the centre and S., is low, and produces excellent crops, the principal of which are oats, wheat, barley, and green crops. The coast is rocky; in the interior are several small lakes, and slate, limestone, and freestone are found. On account of its mild and moist climate, B. is called the 'Devonshire of Scotland,' and is much resorted to by invalids. Rothesay, a fashionable watering-place, is the chief town, about 4 miles S. of which is Mount Stuart, a seat of the Marquis of B., who owns most of the island. Dungyle, a vitrified fort on the S.W. coast, Kames Castle, and the Devil's Caldron, a circular structure 30 feet in diameter and 10 feet high, are the principal antiquities.

Buteshire, comprising B., Arran, the Cumbræes, Holy Isle, Pladda, and Inchmarnock, has an area of 225 sq miles, and a pop (1871) of 16,977. The valuation for 1874-75, exclusive of the burgh of Rothesay, was £54,290. B. returns one member to Parliament.

Bute, John Stuart, Third Earl of, was born in 1713. He is chiefly memorable as having had a great influence in the earlier years of the reign of George III. He had been one of the lords of the bedchamber to his father, Frederick, Prince of Wales, and was groom of the stole to the King himself. After being a chief Secretary of State, he was Prime Minister from 29th May 1762 to 8th April 1763, and, partly because he was a Scotchman, partly because he was a staunch upholder of the royal prerogative, he became very unpopular. He soon retired from politics, although he long exercised an influence over the King, and died 10th March 1792. Apart from politics, B. was an amiable man, with some literary tastes, he was also much given to scientific pursuits. The present representative of the family, John Patrick Crichton Stuart, Marquis of B., was born in 1847. He is distinguished for his great wealth, which had accumulated during a long minority, and for his conversion to Roman Catholicism.

Buttea, a genus of plants belonging to the sub-order *Papilionaceæ* of the natural order *Leguminosæ*. *B. frondosa* and *B. superba*, large shrubs or small trees, natives of India, are the best known. The red resinous tears which exude from the twigs constitute one of the kinds of Lac (q.v.) sold in the Indian markets. It is believed to be formed by insects, as the juice of the tree is colourless. From the roots of *B. frondosa*—the *Dhak* tree of India—fibre ('Pulos cordage') used in caulking boats is extracted. The flowers yield a beautiful yellow or orange dye. It yields a gum known in commerce as *B. gum* or *Bengal Kino*, used in India in diarrhoea and similar diseases, and in tanning, &c. *B. parviflora* also yields a similar substance. The seeds of *B. frondosa* are considered in India a powerful vermifuge.

Butera, a town in the Sicilian province of Caltanissetta, on the Manfria, 8 miles N.N.W. of Serranova. Pop. 5150. B. was besieged by the Saracens in 853, and taken by the Normans in 1089. It has a castle belonging to the Norman period, and extensive ruins of an older antiquity are found in the vicinity.

Butler, Benjamin Franklin, was born at Dedfield, New Hampshire, United States, 5th November 1818. He graduated at Waterville College, Maine, in 1838, studied law in Lowell, Mass., and was admitted to the bar in 1841. He soon became noted in Lowell, and throughout the state, as a criminal lawyer and an active Democratic politician. In 1853 he went to the State Legislature, and was in the State Senate, 1859-60. B. was a delegate to the Democratic Convention which met in Charleston, 1860, and he there supported the nomination of John Breckenridge, the extreme Southern candidate. At the outbreak of the war in 1861, he took the Union side, and marched to the field with the 8th Massachusetts Brigade. He received a check at Great Bethel, but was promoted to the command at Baltimore, and afterwards to E. Virginia. After Admiral Farragut took New Orleans, B. held military possession of the city, and became notorious for the severity of his rule, especially in regard to Southern women. He acted under General Grant before Petersburg, but having refused to co-operate with the naval forces, he caused the failure before Fort Fisher, and was relieved of his command. General Grant expressing disapprobation of his procedure. Returning

to Massachusetts, he was elected to Congress in 1866, rapidly gained the confidence of President Grant, and became a power in the Legislature. In 1871 he tried to get the Republican nomination for the Governorship of Massachusetts, but was defeated by Washburne. In the autumn of 1874 he lost his seat in Congress. B. is an acute lawyer and politician, but is distrusted by a considerable section of the American people.

Butler, Joseph, one of the most distinguished theologians that Britain has produced, was the son of a Dissenting shopkeeper at Wantage, in Berkshire, and born 18th May 1692. He was educated originally for the ministry of the Presbyterian Church, but conformed, studied at Oriel College, and took orders. In 1718 he was appointed preacher at the Rolls Chapel, and in 1725 rector of Stanhope, in the county of Durham, where he lived in such retirement that Queen Caroline believed he was dead. In 1733 he became Prebend of Rochester and chaplain to Lord Chancellor Talbot, in 1736, Clerk of the Closet; in 1738, Bishop of Bristol, in 1740, Dean of St Paul's; and in 1750, Bishop of Durham. He died at Bath, June 16, 1752, and was buried in Bristol Cathedral. Both as a man and as a prelate, B.'s character stands deservedly high; he was at once liberal and judicious, gentle and shrewd. But it is as a metaphysician and a theologian that B. will be best remembered. He showed his remarkable powers at the age of twenty-two, in the letter which he wrote criticising Dr Samuel Clarke's *Demonstration of the Being and Attributes of God*, and still later in his sermons originally delivered when he was preacher at the Rolls Chapel, and published in 1726. In 1736 appeared his greatest work, *The Analogy of Religion, Natural and Revealed, to the Constitution and Course of Nature*, the object of which, as the title implies, is the defence of revealed religion, on the ground that the general analogy between the principles of divine government as revealed in the Scriptures and those shown in the course of nature leads to the conclusion that the author of them is the same. Whatever may be thought of the convincing nature of the reasoning in the *Analogy*, there can be no question as to its strength and closeness. In three of his sermons on *Human Nature*, B. laid the basis of much of the later English ethical philosophy, maintaining as his cardinal principle the supremacy of conscience. See M. Arnold, *Bishop B. and the Zeit-Geist*; Leslie Stephen, *English Thought in the 18th c.*; and the Rev. J. R. T. Eaton, *Bishop B. and his Critics* (Lond. 1878).

Butler, Samuel, author of *Hudibras*, was born in 1612, at Streatham, Worcestershire, where his father had a small farm. He was educated at Worcester grammar-school and at Cambridge, but did not graduate. After acting as clerk to a justice of the peace, living in the household of the Countess of Kent, and acting as amanuensis to the learned Selden, he entered the service of a Puritan colonel, Sir Samuel Luke of Bedfordshire, who seems to have been the prototype of *Hudibras*. After the Restoration, B. became secretary to Lord Capberly, who made him steward of Ludlow Castle. He published the first part of *Hudibras* in 1663, and the second part in the following year. *Hudibras* at once became the favourite book of the age, but, while the King was incessantly quoting it, the author owed his escape from starvation to the liberality of a friend. The third part of *Hudibras* appeared in 1678, and on the 25th September 1680 its author died, unrequited by the Royalists whom he had so brilliantly amused and served. B.'s life is hidden in obscurity. We know little more than that he latterly suffered great distress, and died in extreme indigence. B. was not merely a zealous anti-Puritan, he hated courtly license as well as sectarian cant. He satirised the 'royal society' in *The Elephant in the Moon*, alluded to the profligacy of Whitehall in the *Enchanted Bower of Hudibras*, and among his remains is a satire on *The Licentious Age of Charles II*.

Hudibras is a pasquinade ridiculing the Puritans in the persons of a Presbyterian colonel and Independent squire, who are involved in ludicrous controversies and farcical mishaps while seeking to repress popular amusements. The book is replete with grotesque drollery, recondite learning, trenchant irony, novel and felicitous rhymes, aphoristic couplets which have passed into general use, and quaint, caustic, and sparkling wit, unexcelled by any English writer. In his use of whimsical illustrations, B. resembles Donne and Cowley, with the advantage that his conceits are in keeping with his burlesque theme and nototous merriment. The best edition is that by Robert Bell (3 vols. Lond. 1861).

Butler, William Archer, a theological and philosophical writer, was born at Annerville, near Clonmel, Ireland, in 1814. He studied at Trinity College, Dublin, was appointed, in 1837, Professor of Moral Philosophy there, and died 5th July 1848. His *Lectures on the History of Ancient Philosophy* (2 vols. Camb. 1856, edited by W. H. Thomson) display great learning and philosophical acumen. His *Sermons* (Dub. 1849) are remarkable for eloquence, taste, and judgment. Other works are *Letters on the Development of Christian Doctrine* (Dub. 1850), *Letters on Romanism* (Lond. 1854). All B.'s works are posthumous.

Butlerage of Wine, an ancient duty on wine falling to the crown. It is otherwise called the *prisée* of wine. The crown was entitled to take two tuns of wine from every English or foreign ship importing into England twenty tuns or more. This was changed to a money-tax under Edward I. It was payable to the king's butler, hence the name.

Butomus, a genus of flowering plants of the natural order *Alismaceæ*, of which one species, 'the flowering rush' (*B. umbellatus*), is found in watery ditches and shallow ponds and streams; dispersed 'over the greater part of Europe and Central and Russian Asia to the Arctic regions; represented in N. America by a slight variety, now said to be a distinct species; in Britain, limited to England and Ireland, with the exception of a single station near Paisley, in Scotland' (Bentham). It is a very beautiful plant.



Butomus umbellatus.

Bu'ton, an island of the Malay Archipelago, separated from the S. E. end of Celebes by B. Strait. The Dutch, to whom it belongs, used to destroy the clove-trees, as interfering with their monopoly in cloves. In character and produce it resembles generally Buru (q. v.).

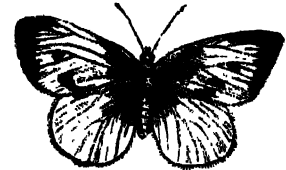
Butter (Lat. *butyrum*) is the solid fat obtained from the milk of all mammalian animals, but in commerce it is only the B. obtained from cow's milk which is met with. The fat is disseminated through new milk in minute globules enclosed within a thin sac or membrane, and being specifically lighter than the fluid in which it floats, it gradually rises to the surface as *cream*. The prolonged agitation of cream, such as is accomplished in any of the numerous forms of Churn (q. v.), ruptures this membrane, and the escaped fatty particles agglutinate to form B. It is found that the making of B. is facilitated by a heat of about 60° F., and on this account a small quantity of hot water is usually added to the cream before churning. B. is also prepared from new milk before the cream has had time to rise to the surface. Pure B. is composed of several fatty principles, the chief of which are stearine, margarine, and oleine (butyroleine), which together should form about 98 per cent. of the fat, the remainder consisting of minute portions of butyrine, caprine, and caproine, to which the peculiar aroma and taste of B. is due. In addition to these fats, B. always contains a certain percentage of casein, water, and salts. Good sweet B. should have a straw-yellow colour, a firm, but not hard consistency, and a faint, pleasing odour and taste. It becomes rancid on keeping, owing to a fermentation set up by the nitrogenous casein which it always contains; but the more carefully the B. is prepared and washed, the longer will it keep fit for eating. Keeping B. in water renewed from day to day also tends to retard rancidity, and it is said that water acidulated with 2 per cent. of acetic or tartaric acid is an excellent preservative medium. The usual way of preserving B. is by salting, and the quantity of salt varies with the length of time the B. is to remain unused. Powdered B. is very lightly salted for immediate consumption, and in this form B. is chiefly used in English towns, where entirely fresh B. is little consumed. Fully salted B. should have worked into it about one ounce of salt to every pound, and it should be carefully covered from the air. In using, the surface should be kept covered with a strong brine containing saltpetre. A salting compound, composed of one part of nitre, one of sugar, and two

of salt, also gives excellent results. B. is imported into this country in enormous quantities from Holland and Denmark, and in the N. of Ireland large quantities are made for export. The B. of different localities varies considerably in richness of flavour, chiefly owing to the feeding of the cows, and, to a less extent, on account of the treatment of the milk. B. is often adulterated by the addition of lard and other animal fats, flour and potato starch, curd, &c., and its bulk is fraudulently increased by working up water with it. An artificial fatty compound has been proposed as a substitute for B. under the name of 'butterine,' and a good deal of so-called B. might be honestly sold under that name. The colour of inferior and factitious B. is improved by annatto paste.

Butteroup. See *RANUNCULUS*.

Butterfish. See *GUNNEL*.

Butterfly, the popular name of the typical insects belonging to the order *Lepidoptera* ('scale-winged'), and to the *Diurnal* section of that group. The butterflies are included under a great number of genera and species, forming numerous families. As in other *Lepidoptera*, the mouth is eminently of the *suctorial* type, and adapted for sucking up the juices of flowers. Thus a spiral *proboscis* or *antlia*, formed of the modified *maxilla* or lesser jaws, exists as the chief organ in the B.'s mouth. The wings are four in number, and are covered with minute feather-like scales of varied shapes, which being coloured by metallic tints and lustres, and being marked by microscopic lines or *striae*, possessing refractive properties, cause the wings to exhibit the gorgeous hues so familiar to all. The butterflies of the tropics possess the most vivid and gorgeous colours. The wings when at rest are held erect, those of the moths being generally dependent, and coloured on the upper side only. The wings of butterflies also differ from those of moths, in that when flying they are separated, and not attached together by means of hooked processes, or *retinacula*. The antennæ of butterflies are knobbed. The larvæ or caterpillars possess six true or *thoracic*, and ten false, or *pro-legs*. The *pupa*, or *chrysalides*, are always attached by the posterior extremity, or head downwards, and often exhibit angular shapes and forms. The pupæ are further rarely enclosed in *cocoons*, but are contained within the larval skin, from which the *imago*, or perfect-winged insect, finally escapes. These forms thus exhibit the typical or complete form (*Holometabolic*) of *Metamorphosis* (q. v.), in which the larvæ are active, and the pupæ quiescent.



Pontia Brassica.

Butterflies are widely distributed, and occur in all quarters of the globe, but attain their largest size and most luxuriant appearance in tropical regions. All of these insects fly well and rapidly, and appear in some instances—as seen in the tropics—to migrate suddenly and unaccountably to distant parts. The eggs are deposited on leaves, which are eaten by the developing larvæ. The period at which the eggs are hatched varies greatly; in some cases, a few hours may suffice in summer, whilst in other cases, the eggs deposited in autumn are not hatched until the succeeding spring or summer. The larvæ are exceedingly destructive to the leaves of plants, and commit much havoc in gardens and nurseries. The caterpillars vary in appearance according to the species of B. of which they are the immature forms.

These insects are named *Diurnal Lepidoptera* from their habit of flying abroad during the day, and in contradistinction to the moths or *Nocturnal* forms. The group includes two main sections; the families of the first being distinguished by the possession of a single pair of spines on the tibiae of the legs; those of the second group possessing two pairs of spines on the tibiae of the hinder pair of legs. The most familiar forms belong to the family *Papilionida*, of which the peacock B. (*Papilio* or *Vanessa Io*), the tortoiseshell (*V. Urtica*), the red admiral (*V. Atalanta*), &c., are well-known examples.



Cynthia Cardui.

The Painted Lady (*Cynthia Cardui*) is remarkable as occurring in almost every quarter of the known world. The common white cabbage B. (*Pontia Brassicae*), the larvæ of which are the pests of the gardener, is the best known of the more common species. Other forms are the copper butterflies (*Polyommatus*) and the blue B. (*Lycana*). See also articles on the CABBAGE B., PURPLE EMPEROR, and other typical species.

Butterfly-Fish. See BLENNY.

Butterfly-Weed, or Fleury's Root, is derived from *Asclepias* (q. v.) *tuberosa*. The plant is a native of the United States. It has a large tuberous root, with a bitter nauseous taste. It has been used, especially in America, as a medicine. In small doses it causes sweating, and in large doses purging. The root is the part used, and has been highly recommended in pleurisy. It is best given in the form of an infusion. The dose corresponds to 20 or 60 grains of the root several times a day.

Butter-Milk, the liquid which remains after the churning of cream or sweet-milk for the preparation of butter. Although deprived of much of the fatty matter of milk, it is still a highly nutritious and healthy beverage, and is much used by both the Irish and the Scotch—by the former in conjunction with potatoes, and by the latter with oatmeal porridge. Its average composition may be stated thus: nitrogenous matter, 4.1; fat, 0.7; sugar of milk, 6.4; salts, 0.8; water, 88.0.

Butter, Rock, a mineral occurring in several places on the continent of Europe, and also at Hurler near Paisley. It exudes from rocks containing alum or its constituents—particularly from alum-slate, and other schistose rocks. It is greasy to the touch, easily broken to pieces, and varies in colour from yellowish white to sulphur yellow.

Butter-Tree, a name given to several trees of the genus *Bassia* (natural order *Sapotaceæ*), on account of the solid fat yielded by their fruits. *Bassia butyracea* and *B. latifolia* are both natives of India, where the solid fat from their seeds is used for culinary and other purposes. The flowers of *B. latifolia* (Moh-wah flowers) are used as food, and yield a spirit on distillation extensively consumed in the East. *B. Parkii*, named after Mungo Park the traveller, yields a similar fat, on the W. African coast, where it is known as Shea Butter.

Butterwort (*Pinguicula*), a genus of plants of the natural order *Lentibulariaceæ*. The common B. (*P. vulgaris*) grows in common and wet ground very generally over Great Britain, and is found as far N. as Greenland. It has the power of coagulating milk, hence its name; or, as some say, it derives its name from its smooth shining leaves. Berwickshire shepherds call it *Rotweed*, from an idea that it causes 'rot' in sheep.

Buttisholz, a village in the canton of Lucerne, Switzerland, 11 miles N.W. of Lucerne, celebrated as the place where De Coucy, son-in-law of Edward III. of England, was defeated by the Swiss peasants. The *English Barrow*, a large mound near the village, marks the grave of 3000 of his followers.

Buttman, Philipp Karl, a celebrated German philologist, was born at Frankfurt-on-the-Main, 5th December 1764. After studying at Göttingen, he became assistant in the royal library at Berlin in 1789, secretary in 1796, and chief librarian in 1811. In 1800 he accepted a mastership in the Joachimsthal Gymnasium in Berlin, and on the institution of the University of Berlin in 1808, though he held no special professoriate, devoted his energies to promote its prosperity, and foster the talents of the more promising youth, his house being the rendezvous of all the distinguished scholars in Berlin. B. died 21st June 1839. The best known of his valuable contributions to Greek philology are his *Griech. Grammatik* (Berl. 1792; 22d ed. 1869), and his *Lexilogus für Homer und Hesiod* (Berl. 1818-25; 2d ed. 1860), of which an excellent translation by Fishlake has long been a popular book of reference at British universities. His editions of classic authors are highly valued. The latest edition of B.'s grammatical works is that by his son Alexander (1859).

Button (Fr. *bouton*, from *bouter*, 'to push or place'), a familiar appendage of dress, worn for fastening as well as for the purpose of ornamentation. The use of buttons is as general

as the use of civilized clothing, of which they form an indispensable part. Buttons are not mentioned in English literature till the time of Edward I., in whose reign the habit of servants aping their masters is thus satirised—

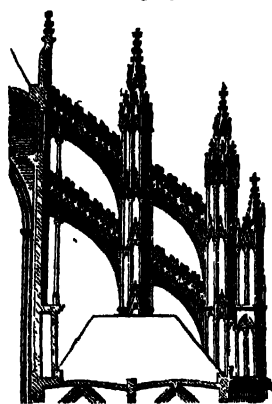
'Now the horse-clawers, clothed in pride,
They busk them in buttons as it were a bride.'

From this period the use of buttons for ornament as well as use has continued to the present day, with fluctuations in fashion occasionally affecting the demand. In the time of William and Mary, it was represented to Parliament that thousands of men, women, and children 'depended on the making of silk, mohair, thread, and gimp buttons, and that the makers of such needlework buttons were injured by the wearing of buttons made of threads of cloth, serge, drugget, frieze, camlet, and other stuff and materials.'

The manufacture of buttons at the present day is principally carried on at Birmingham, Paris, Lyons, Vienna, and in several German towns. As they are made from an endless variety of materials, the processes by which the manufacture is conducted are greatly diversified; but generally they may be divided into four classes—1st, pearl and other turned buttons; 2d, metal buttons; 3d, covered buttons; and 4th, fancy buttons. In the making of pearl buttons, no further machinery is required than a foot-lathe and cutting and boring tools. Pearl B.-making is, on this account, extensively pursued as prison labour in France; and it is estimated that in Birmingham more than two thousand people find occupation in this branch. The mother-of-pearl out of which the buttons are turned consists chiefly of the bivalve shells of *Meleagrina Margaritifera*, and are imported from the East Indian seas, Manilla, and the Eastern Archipelago, and from Panama. The processes employed in making pierced bone and ivory buttons are the same as in the case of pearl buttons, and there are many other materials similarly turned. Among the substances largely so used may be enumerated vegetable ivory or Corosso nuts, which are the fruit of a South American palm (*Phytelephas macrocarpa*), betel-nuts, (*Areca catechu*), and boxwood, ebony, and coco wood, &c. Metal buttons are made for army, navy, livery, hunting, college service, and generally for all uniform purposes, besides for the ornamentation of the dresses of ladies and children. They are made of various metals and alloys, in the form of plain flats, chased flats, dead gold, coloured gold, plated gold, die stamped, engine turned, silvered, oxidised, and bronzed, besides in numerous other forms of metal combined with other materials. Livery buttons have usually a crest in relief on their surface struck from a die, and some of the old hunting buttons had designs of much spirit and artistic merit struck on them. The stalks of solid metal buttons are fastened by hard solder; and when gilt, it is now done by electro-plating; but silvered livery buttons are struck from the old form of plated silver. The consumption of metal for B.-making in Birmingham alone was, several years ago, estimated at from six to eight tons weekly, exclusive of iron and tin, of which probably twice as much was used. The manufacture of metal buttons is, however, a declining industry, as it has been largely superseded by covered buttons. In the reign of William and Mary an Act was passed imposing a penalty of 40s. on the making and using of every half-dozen of covered buttons, in consequence of the representations above alluded to. But in spite of legislative prohibition this style of B. has grown in favour till it now overshadows all others. The covered buttons with flexible cloth shanks, such as worn on dress-coats, are made by means of hand-stamping presses, and the series of operations are rather numerous. The iron ring, through which the cloth shank on the under side protrudes, is cut out of sheet-iron, pierced, stamped, and jappanned in four operations, and the disc of cloth for the shank is cut out and placed in the ring in two operations. The stamping out of the shell over which the B. cover is stretched involves three operations; a disc of millboard has to be stamped out to fill up the interior of the B., and circular discs of the covering material have similarly to be stamped out before all these various pieces are brought together to be fastened by a hand screw-press into the complete B. The processes employed in making linen-covered buttons, and in all fancy silk-covered buttons, are very similar to the above, but when the tops are rounded, the 'shells' require to be struck several times in the die, between each of which blows the metal has to be annealed. Horn buttons,

which are really made from the hoofs of cattle, are chiefly manufactured in France, and a Frenchman, M. Emile Bassot, was the inventor of the appliances by which they are cut, and the designs on them stamped in relief. Glass buttons are moulded by pinching the material in a half soft condition in a pair of hot pincers in which a die with the design to be produced is set; and when such buttons are cut or faceted, it has to be done by the ordinary processes. Porcelain buttons, in imitation of pearl shirt-buttons, are also very largely made in France, and they can be produced so cheaply that a great gross (144 by 144) is sold, mounted on paper, for about 11d. Fancy buttons are also made of papier-maché, vulcanite, many composite materials, marbles, and fancy stones; and indeed it is difficult to say what material is not used. The Chinese and Japanese expend much artistic skill and ingenuity in the carving of ivory and wood buttons of large size, and some of them are of great value.

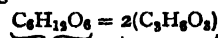
Buttress, a projection from a wall for the purpose of increasing its stability. Buttresses are made in various forms, corresponding to the style of architecture of the building to which they belong. They do not occur at all in Grecian buildings, or buildings in the Grecian style. 'Flying buttresses' are in the form of a sloping arch connecting the upper and central part of a building (as, e.g., the clerestory) with the side walls. They are generally used to transmit part of the thrust of an arched roof to the outer buttresses, when the inner wall or column does not possess sufficient stability to resist the thrust alone.



Buttress from Cologne Cathedral. PELOS.

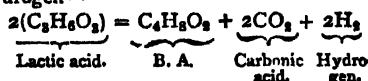
Bu'tua Root. See CISSAM.

Butyric Acid is an oily liquid occurring in small quantity as a glyceric ether in fresh butter, and in the free state in rancid butter, in human perspiration, the juices of animals and of some fruits, and in minute quantity in the waters of certain lakes. *Butyrate of calcium* is best prepared by allowing a mixture of chalk, sour milk, sugar, and decayed cheese to remain for some months in a warm place; fermentation takes place, and in the first instance the sugar is resolved into lactic acid.



Grape sugar. Lactic acid.

The lactic acid subsequently decomposes into B. A., carbonic acid, and hydrogen—



To extract the B.A., the product of the above reactions is boiled with carbonate of soda, filtered, evaporated to small bulk, mixed with sulphuric acid, and the oily layer which separates decanted and distilled. B. A. is a colourless, oily liquid of peculiar and characteristic odour, recalling at the same time the smell of cheese, rancid butter, and pine-apples. It is miscible in all proportions with alcohol and ether, and is also soluble to a considerable extent in water. It boils at 157° C., and is lighter than water (sp. gr. '98). It forms crystalline salts with the metals which are of no practical importance.

Butyric Ether, or Pine-Apple Oil, is used in confectionery and perfumery. It may be obtained by distilling a mixture of butyric and sulphuric acids with alcohol, but is prepared commercially from butter. The butter is saponified with potash, and the resulting soap is dissolved in alcohol, and distilled with sulphuric acid as long as anything volatile passes over. B. E. possesses the characteristic odour of pine-apples, and indeed is the cause of that odour in the fruit. It is also present in pine-apple rum. It boils at 119° C., is lighter than water (sp. gr. '9), and has the chemical formula $\text{C}_4\text{H}_8\text{O}_2(\text{C}_2\text{H}_5)$.

Buxar, a town of British India, province of Bengal, district of Shahabad, on the Ganges, 398 miles N.W. of Calcutta. It is historically interesting as the scene of the great victory won (October 23, 1764) by Major Munro, with a force of 7072 men, over a native army 50,000 strong, under the Nabob Vizier of Bengal—a victory which made the English masters of the entire valley of the Ganges, from the Himalaya to the sea, and placed Hindustan at their feet' (Marshall's *Hist. of Ind.* c. xi.). Pop. (1872) 13,446.

Buxbaumia, a genus of mosses, of which only one species (*B. apophylla*) is known. Minute scales take the place of leaves.

Buxton ('the town of beech-trees'), a market-town and watering-place in the N.W. of Derbyshire, 33 miles N.W. of Derby, and 160 miles from London. It is a station on a branch of the Midland Railway. B. lies in a moorland dell near the source of the small river Wye, which flows into the Derwent. The waters of its calcareous and chalybeate springs have been in use since the time of the Romans. They were greatly in vogue before the Reformation, and, since the present baths were rebuilt, rank among the finest in Europe. The waters are taken for cutaneous and nervous diseases, indigestion, rheumatism, and gout. From June to October B. is visited, on an average, by 12,000 to 14,000 persons, and can accommodate nearly 5000 strangers at one time. The Devonshire Hospital, supported by subscription, contains 100 beds, and lodges and boards annually nearly 1000 patients free of charge. A striking feature of the town is the magnificent Crescent, built about 1780 by the Duke of Devonshire, in which there are two hotels, a library, assembly-rooms, &c. Pop. (1871) 3717. Diamond Hill, well known for its crystals, and the stalactitic caverns, Poole's Hole, 560 yards long, are interesting objects in the neighbourhood.

Buxton, Sir Thomas Fowell, a noted philanthropist, was born at Earl's Colne, in Essex, 1st April 1786. Educated at the University of Dublin, he threw his energy, which, physical as well as mental, was immense, into the trade of brewer, and speedily made a great fortune. He had married a sister of Mrs Fry, the well-known philanthropist, and this fact, acting upon a manly religious nature, made him enter heartily into the philanthropic schemes of the period. He entered Parliament as member for Weymouth, and, till he was ousted in 1837, was one of the most earnest advocates in Parliament of slave emancipation and the amelioration of prison discipline. B. was made a baronet in 1840, and died at Northrepps, February 19, 1845. See *Memoirs of Sir Thomas Fowell B.* (Lond. 1848; 3d ed. 1851), edited by his third son, Charles Buxton (born 1822, died 1871), whose premature death deprived England of a high-toned politician and an accomplished writer.

Bux'torf, Johann, 'the prince of Hebrew scholars,' was born at Kamen, in Westphalia, 25th December 1564, and after studying at Marburg, Basel, and Geneva, became Professor of Hebrew at Basel in 1591, and died 13th September 1629. Such was his proficiency in matters connected with Hebrew literature, that it is said even the Jews resorted to him for counsel. His chief works are *Biblia Hebraica Rabbinica* (4 vols. Bas. 1618-19); *Tiberias seu Commentarius Massoriticus* (Bas. 1620); and *Lexicon Hebraicum et Chaldaicum* (Bas. 1607).—His son, also called **Johann**, and known as the 'younger B.,' was born at Basel, 13th August 1599. He rivalled his father in his acquaintance with Hebrew, and succeeded him in the Hebrew chair at Basel, where he died, 16th August 1664. B. was involved in a controversy with Capellus, in which he maintained the divine authority of the entire Masoretic text, vowels and consonants, words and things. Among his works are a *Lexicon Chaldaicum et Syriacum* (Bas. 1622); *Lexicon Chaldaicum, Talmudicum et Rabbinicum* (Bas. 1639), partly from his father's literary remains; and *Concordantia Bibliorum Hebraicorum* (Bas. 1622).—**Johann Jakob B.** (born 1645, died 1704), son of the preceding; and **Johann B.** (born 1663, died 1732), nephew, were also Professors of Hebrew at Basel.

Buxus. See BOX.

Buyuk'dereh, a charmingly situated suburb of Constantinople, on the Bosphorus, and a favourite residence of the Christian ambassadors.

Buzzard (*Buteo*), a genus of Raptorial birds, forming the type of the sub-family *Buteonina*, and nearly allied to the Falcons.



Honey Buzzard.

In general form, the buzzards are intermediate between the hawks and kites and eagles. The bill is broader at the base than in the hawks, and is compressed at its point, the sides being sloping, and the margins sinuous or festooned.

The cere covers the base of the bill. The wings are long and rounded, the third and fourth quills being the longest. The legs are strong and short, and the tarsi may be naked or feathered partly or completely. The toes are short. Buzzards when seeking prey fly slowly, and at a short distance from the ground. They feed chiefly on the smaller mammals and birds, though also on worms,

reptiles, &c. Buzzards chiefly occur in the New World, but are common in the eastern hemisphere. The common B. (*Buteo vulgaris*) averages 20 inches in length, and inhabits Britain permanently, occurring also in Europe, N. Africa, Asia, and N. America. The upper plumage is brown, varied with black, the under parts being of a white or greyish-white colour. The extended wings may measure 4 feet from tip to tip. This bird may exhibit a tendency to domestication, and the females have been repeatedly known to hatch and bring up broods of chickens. The rough-legged B. (*Buteo or Archibuteo lagopus*) is rarer in Britain than the common B., but is distributed generally over the European and African continents, and in the United States of America. The tarsi are covered with feathers even to the toes, and this species is of larger size than the common B. The European honey-B. or bee-hawk (*Pernis apivorus*) is rare in Britain, where it is a summer visitant only, but occurs in Europe. It feeds upon bees and wasps. An allied Indian species (*P. cristata*) feeds on caterpillars, and others on honey. The red-tailed hawk or B. of N. America (*B. borealis*) destroys poultry; and other species are the jackal-B. of S. Africa (*B. jackal*)—so named from the sound of its voice resembling the jackal's cry—and the *B. melanosternon* of Australia. The Marsh-harrier (q. v.) sometimes receives the name of moor B., and the Osprey (q. v.) is occasionally known as the bald B.

Byblos, a very ancient maritime town of Phœnicia, a little to the N. of Beirut, and the chief seat of the worship of Adonis, was the same as the Gebel of Ezekiel xxvii. 9, in which passage the LXX. has *Bibians*. The modern Arab name is Jebel. There was also an Egyptian B. in the Delta of the Nile, which took its name from the *byblus* or papyrus plant, extensively manufactured here in ancient times into writing material.

Bylaws. Every corporation has power to make private laws, called B., for the government of itself; and these laws are binding, unless contrary to the law of the land or to the charter of the corporation. Under the Municipal Corporation Act, a borough council may make certain B. for the borough, subject to the approval of the Privy Council. The Board of Trade exercises a supervision over the B. of railway and some other public companies.

Byng, George, Viscount Torrington, a British admiral, was born at Wrotham, in Kent, 27th January 1663, entered the navy at an early age, rapidly rose in the service, took the side at the period of the Revolution of the Prince of Orange, and in 1703 became Rear-Admiral of the Red. He distinguished himself at the taking of Gibraltar and the battle of Malaga, and commanded, in 1715, the squadron which forced a French fleet that was intended to cover an invasion of Scotland by the Pretender to retire to Dunkirk. In 1718 he defeated the Spanish fleet off Messina. In 1721 B., who had been knighted after the battle of Malaga, was created Viscount Torrington; and on the accession of George II. was appointed First Lord of the Admiralty. He died January 17, 1733.—**John B.**, a British admiral, celebrated for his bravery and misfortunes,

the fourth son of Viscount Torrington, was born in 1704, entered the navy at the age of thirteen, served under his father, and became a captain in 1727. He distinguished himself as a naval officer, and in 1748 was made Admiral of the Red. In 1756 he was sent to relieve Minorca, but failed through inactivity, it was said; and such was the popular indignation, and such the anxiety of the Ministry of the period to divert odium from itself, that he was tried by court-martial, condemned to death, and shot, 14th March 1757. He met his death with great firmness. He was a very brave man, but a somewhat stern disciplinarian.

Bynkershoek, Cornelius Van, a Dutch juriconsult, born at Middelburg, Zealand, 29th May 1673; studied at Faneker, and in 1694 commenced practice as an advocate at the Hague. He was profoundly versed both in Dutch and in international law, and his *Quæstiones Juris Publici* (Leyd. 1737), his *Quæstiones Juris Privati* (left incomplete), and his *Corpus Juris Hollandici et Zelandici*, show complete mastery of the principles and details of every department of jurisprudence. He studied Roman law assiduously, as is seen from his *Observationum Juris Romani Libri IV.* (Leyd. 1710), followed in 1733 by *Observationes Juris Romani*. B. died 16th April 1743. Professor Vicat, of Lausanne, published at Leyden in 1760 (2d. ed. 1766), and at Geneva in 1761, a complete edition of his works in 2 vols. fol.

Byre (a form of *Bower*, q. v.) is the name used in Scotland to denote a house for dairy cows, but also employed in many localities to designate the place where neat and fattening cattle are accommodated. Till within the last dozen years, not half the attention that ought to have been given was bestowed upon the B., and even now (1876) there is great need for improvement. There can be little doubt that not a small proportion of the diseases cattle suffer from are induced and fostered by uncleanly and ill-ventilated byres. The B. should be placed in the immediate neighbourhood of the root and straw stores, so as to avoid unnecessary carriage. Dairy cows should have, if practicable, a stall each, and this should not be less than 4 feet wide—indeed, 5 feet is better. In a single-stalled B. Mr Henry Stephens recommends a width of 18 feet, giving 2 feet for the manger, 8 feet for the length of the cow, a foot for the gutter draining off the fluid refuse, and 7 feet for passage for removal of dung, conveyance of food, &c. Perhaps 20 feet would be preferable, as giving more convenience for dairy cows, although the spaces mentioned are sufficient for feeding cattle. Ventilators should be placed at intervals of every five or six cows, and so arranged in the ceilingless roof as to supply fresh air without causing draughts. Light should come in through windows in the wall behind the cattle. In the case of feeding oxen, two may well stand in a stall together provided it be 9 feet wide, but it is better in all cases to have each animal stalled by itself. Dairy cows do not, as a rule, agree very well with each other, and the consequence is that they sometimes do not yield so much milk as they would do if alone; and in feeding cattle it is frequently noticed that one robs the other of its due share of food. In the best-appointed byres the food is run along in a waggon on rails in front of the cattle. The mangers are best placed about 20 inches in height above the ground, and they should be wide enough to keep long-horned animals from injuring the tops of their horns against the walls. The gutter should drain itself into a liquid-manure tank, and the pavement of the floor should not be carried further than the hind posts, as the stones in front hurt the knees of the animals, and not unfrequently produce permanent swelling. See Stephens's *Book of the Farm*.

Byrgius, Justus, the Latinised form of Jobst Bürgi, a celebrated mechanician, inventor, and astronomer, was born February 28, 1552, at Lichtensteig, in the Swiss canton of St Gall, and died at Cassel in 1633. His celestial globe was a beautiful silver-plated piece of workmanship; and he seems to have invented something like logarithms (*Arithmet. und Geometr. Progress-Tabulen*, Prag. 1620) and the proportional compasses.

Byron, George Gordon, Lord, the greatest poet of the English aristocracy, was born in London, 22d January 1788. His father was a dissipated captain of the Guards; his mother, née Catherine Gordon, a Scottish heiress. Her fortune was speedily wasted, and, separating from her husband (who died at Valenciennes in 1791), she withdrew to Aberdeen, there to bring up her child on a very straitened income. Circumstances, however, were suddenly altered by the death, in 1798,

of the fifth Lord B., when the title and estates lapsed to his grand-nephew, the poet. Mother and son at once left Aberdeen for the family seat, Newstead Abbey, in Notts, and B.'s education was completed at Dulwich and Harrow. While still a Harrow boy, he had his love affair with Miss Chaworth. This was his first *grande passion*; and the lady's rejection of his suit affected him strongly. In 1803, B. entered Trinity College, Cambridge, where he led an irregular life, though always reading widely. In 1807, his youthful work the *Hours of Idleness* appeared; and Brougham's rancorous attack in the *Edinburgh Review* provoked, two years later, the pungent satire *English Bards and Scotch Reviewers*. This work plainly discovered genius; and B. having now achieved some reputation, set out on a Continental tour in 1809. The ripening influence of travel on the poet's nascent genius was displayed in 1812 by the publication of the first two cantos of *Childe Harold*, when, in his own words, 'he awoke one morning and found himself famous.' Next year came *The Giaour*; then the *Bride of Abydos*, the *Corsair*, and *Lara*, all immensely popular. In 1814 he married Miss Milbanke, apparently by way of attempt at self-reform. As such it utterly failed; and, after the birth of one child, Ada, their short and stormy wedded life was ended by Lady B. quitting her husband for ever. To escape this scandal, and the clamour of public opinion, B. left England in 1815, resolving never to return. Change of life gave fresh impulse to his poetic activity. The third canto of *Childe Harold* and *The Prisoner of Chillon* were followed, in 1817, by *Manfred* and *The Lament of Tasso*. These were written at Geneva; while at Venice, in 1818, after completing *Childe Harold*, he composed *Beppo*; and in the next three years wrote the first five cantos of *Don Juan*, and also several dramas. B.'s life was 'now exceedingly profligate; and his *liaison* with Countess Guiccioli led him at last to Pisa in 1821. Here he was engaged on *Don Juan, The Deformed Transformed, the Vision of Judgment*, &c., till the appeal on behalf of Grecian independence enlisted his ardent sympathy. Leaving Italy in 1823, he reached Missolonghi early in the next year. Dissensions among the patriots damped his zeal, but did not lessen his efforts. Health, however, failed him. Rheumatism and fever were induced by exposure; bleeding might have saved him, but he opposed it till too late. He died at six o'clock on the evening of the 19th of April 1824, amidst the poignant grief of his followers. His remains, carried to England, rest in the family vault of the Byrons in the parish church of Hucknall, near Newstead Abbey.

B. throughout his life was singularly unfortunate. He was so in his youthful training, his physical tendencies, his early attachments, his first literary effort, his marriage, and all his relations with the public. These, more than inherent defects, warped his true nobility of nature. Vanity led him to assume a character: what Matthew Arnold calls his 'Titanism' is often only melodramatic. But society could not see through the Byronic mask, and hence resulted acutest pain to the poet's morbid egotism.

Of B.'s works, *Childe Harold* and *Don Juan* are the greatest; the former more dignified and stately, the latter more vivacious and versatile. They, and the poems similar to them, have a marked feature in their intense realism. B. was a realistic poet; and though Swinburne goes too far in declaring that he had little imagination, yet the criticism is partially just. These poems also possess in common one centre figure—the typical Byronic hero in his varied phases of idiosyncrasy. He is, as it were, an ideal B.; and hence that quasi-identification of the poet's self with his conception, which is a distinctive trait of the Byronic school. This trait injures his dramas; for a dramatist must not be an egotist. His shorter pieces show a rare union of power and tenderness; and this exquisite combination explains the exaggerated praise of Karl Elze, when he pronounces B. 'the greatest lyric poet of England.' B.'s literary, like his personal reputation, has touched both extremes with the ebb and flow of popular favour. This seems the truth—that there are certain states of society, certain natures of men, certain moods of the same man, with which the Byronic spirit will be in finest unison, and that there are others with which it must be discordant; hence the tendency to unduly laud or unduly depreciate. As a poet, he has now reached his fit position; not certainly the first, but yet in the foremost rank of English writers. See *Life, Letters, and Journal of Lord B.* by Moore (2 vols. Lond. 1830); Leigh Hunt's *Lord B. and his Contemporaries* (1828); Medwyn's

Conversations of Lord B. (1824); the Countess Guiccioli's *Recollections of Lord B.* (Lond. 1869); and Trelawny's *Records of Shelley, B., and the Author* (new ed. 1878).

Byron Island, one of the Gilbert Archipelago, in the Pacific, a few degrees S. of the equator, in a direction due N. from New Zealand.—B. Bay, a bay on the N.E. coast of Labrador, N. America, on the S.E. side of Cape Harrison.

Byrsonima, a genus of plants of the natural order *Malpighiaceae*, some species of which have edible fruits. They are, however, very astringent. (See BOIS-TAN.) The bark of various species is used in tanning; and American Alcornque bark, which is imported into Britain for the tanner's use, is said to be derived from *B. laurifolia*, *B. rhopalodifolia*, and *B. coccolobifolia*.

Byssus, the name applied to the horny or silky filaments formed by the foot (see MOLLUSCA) of certain Lamellibranchiate (q. v.) molluscs, and popularly and collectively known as the 'beard' of these animals. The B. is well seen in the common mussels, which secure themselves to fixed objects by means of these filaments; and in the *Pinna* (q. v.) molluscs, found especially in the Mediterranean Sea, the B. is produced in such quantities that the Neapolitans and Sicilians have long been accustomed to weave a strong durable fabric from it. This fabric is used in the manufacture of stockings, &c. The B. is of very strong nature, and is secreted by means of a groove on the under surface of the mollusc's foot, into which a secretion is poured in a fluid state. This secretion hardens into a thread-like filament, which is drawn out of the groove, and another supply of the secretion being poured into it, a second thread is thus formed; the process being continued until a bunch of filaments is produced.

Byström, Johan Niklas, a Swedish sculptor, born at Filipstad, in the province of Wermeland, 18th December 1783, worked three years under Sergell of Stockholm, applying himself chiefly to the study of the antique, and gained the Academy's prize in 1809. He proceeded to Rome the following year, whence he soon sent home his 'Drunken and Reposing Bacchante.' He returned to Stockholm in 1815, and exhibited his colossal statue of the Prince-Royal, which pleased so well that he was commissioned to execute statues of Karl X., XI., and XII. on the same scale. These were followed later by colossal statues of Karl XIII., Gustavus Adolphus, and Karl XIV. He died at Rome, 13th March 1848. Among his other works are his 'Cupid depriving Bacchus of his Attributes,' 'Nymph going into the Bath,' 'Hercules at the Breast,' 'Apollo at the Lyre,' 'Pandora combing her Hair with a Book in her Hand,' a statue of Linneus, &c. The works of B. are all natural and animated.

By-Town. See OTTAWA.

Byttneriaceae, a natural order of Dicotyledonous plants, the nearest allies of which are *Sterculiaceae*, *Malvaceae*, and *Tiliaceae*. There are about four hundred species, chiefly tropical plants, but some are found in every quarter of the world except Europe. Some are mucilaginous, like their allies the *Malvaceae* and *Sterculiaceae*. *Theobroma Cacao* is the Cacao or Cocoa Tree (q. v.). The fruit of *Guazuma ulmifolia* is eaten for the sake of its sweet mucilage. The young bark yields on maceration a mucilage which is used in Martinique for clarifying sugar, in the same way as is *Kydia calycina* in N. India. The bark of *Microlena spectabilis* of the regions on the S. spur of the Himalays, *Dombeya spectabilis* of Madagascar, *D. umbellata* of Bourbon, and *Abroma agustum* of various parts of India, yield a fibre used in making cordage.

Byzantine Architecture assumed its distinctive features between the year 328 A.D., when Constantine transferred his court from Rome to Byzantium, and the years 532 and 537 A.D., when the Church of St Sophia was built in that city during the reign of Justinian. This church also marks the climax of the style, it being not only the largest example, but also the one in which the problem of dome construction—its great peculiarity—was most successfully wrought out. Domes had been built previous to this, as in the Pantheon at Rome, but there and in other instances it was merely the roofing-in of a circular drum of solid masonry, while in St Sophia and other B. churches, the dome rests on piers connected together with round arches, thus allowing free access to the other parts of the church grouped

round the dome in the form of a Greek cross. The supporting piers were arranged on plan either in the form of an octagon or a square. The former seems to have been the earliest practice,



Byzantine Capitals at Ravenna.

being the simplest in execution and the least departure from the original Roman method. By the latter the architects gained a complete mastery over the dome, and had fewer obstructions to contend with on their ground plans. They were enabled to do this by corbelling out the space between the connecting arches and the circular dome above. This space was called the 'pendentive'; hence the phrase 'pendentive dome' is applied to all constructed in the B. manner. Certain churches have as many as five domes, as St Mark's at Venice, begun in the year 977, and dedicated at the end of the 11th c. There is a large central dome built as just described, with four smaller ones grouped around, one over each limb of the cross. The Church of St Front, Perigueux, nearly contemporaneous with St Mark, has an almost similar arrangement; and in the same locality there are to be found a great many dome-roofed churches, showing how far W. the influence of B. A. was felt. Several churches along the Rhine, built in the same manner, mark the limits of the style on the N. Notwithstanding those examples, B. A. may be said to be the architecture of the Greek Church, and is chiefly found in Constantinople, Greece, and Asia Minor, in all of which examples are numerous; but with the exceptions of St Sophia and St Mark, all B. churches are of small size. In this style surface ornament is largely used, to the comparative neglect of pure architectural detail, which is further subordinated by the lavish use of gold, variously coloured mosaic-work, and marble slabs let into the masonry.

See *Byzantine Architecture* by Texier and Pullan (Lond. 1864), and Lübke's *Ecclesiastical Art in Germany during the Middle Ages* (Eng. transl. T. C. Jack, Edinb. 1873).

Byzantine Art. Before Constantine publicly made Christianity the religion of the state, the art of the early Christians was a mere adaptation of antique ideas, and practised for the most part in the seclusion of the catacombs; but from the date of that event (324), secrecy being no longer necessary, a new art was gradually developed in Byzantium, which, till the 11th c., exercised a powerful influence on the surrounding nations, and which exists to this day as the art of the Greek Church in Russia. Greek and Oriental artists were employed, and, under their influence and that of antique art, the style arose as perhaps the earliest Christian art distinct from the arts of antiquity. It is characterised by great luxuriance and splendour of material, gold being constantly used for all backgrounds. Mosaic decoration was carried to its utmost—the interiors of many churches being entirely covered by this method. St Mark's in Venice alone contains upwards of 40,000 sq. feet of mosaic, executed in the most gorgeous and costly manner.

After the Iconoclast war in the 8th c., the style began to assume a stereotyped character, in obedience to the strict limits proscribed by the Church to prevent idolatry; and so little was freedom of thought allowed, that the monks of Mount Athos were found practising the art, in 1839, in exactly the same manner as laid down by the Church in the 10th c. As might

be expected, sculpture was not in much esteem, the specimens remaining being few and unimportant.

See Owen Jones's *Grammar of Ornament*, and Wyatt & Waring's *Handbook to Byzantine Court, Sydenham*.

Byzantine, Greek, or Eastern Empire, The, was founded in the 4th c. by Theodosius the Great, who divided the Roman Empire into the E. and the W.; the former including Bulgaria, Thrace, Macedon, Greece, Crete, Asia Minor, Syria, and Egypt. To this Arcadius succeeded on the death of his father in A.D. 395. Rufinus, Prefect of the E., carried on the government by a fiscal oppression and administrative corruption, continued (after the murder of Rufinus by the soldiers of Stilicho) by the eunuch Eutropius, who in 397 passed the law of implied treason, and secured the appointment of Alaric (q. v.) as Master-General of E. Illyricum. After the Ostrogothic rebellion of 399, Eutropius was succeeded by the Arian Goth, Gainas, who gave place to the Empress Eudoxia, the persecutor of Joannes Chrysostom (q. v.). In 408 Arcadius died; till 415 the prefect Anthemius (who repelled the Huns) acted as protector of Theodosius II., who resigned the empire to his sister Pulcheria. Theodosius married the learned Eudocia (Athenais). The war with Persia, securing a readjustment of Armenian territory, the cession of W. Illyria by Valentinian III., the 'cruel and ignominious' treaty with Attila (q. v.) in 446, were followed by the death of Theodosius in 450, and the marriage of Pulcheria with the senator Marcian, who maintained the concessions obtained by Maximin from the Huns. In 457 Leo I., a Thracian military tribune, was placed on the throne by Aspar, the patrician heretic, father of the general Ardaburius. Leo assisted Anthemius against the Vandals. He was crowned by the Patriarch of Constantinople. After a few months' rule of Leo II., his father, Zeno (Trascalisseus), succeeded, and partly by the aid of Theodoric the Ostrogoth, whom he bribed and afterwards encouraged to attack Odoacer in the W., he suppressed the revolt of Verina and Basiliscus. From 491 to 518 Anastasius I. occupied the throne. His reign was troubled by Bulgarian and Persian wars. He built the long wall.

Justin the Elder, an illiterate but successful soldier, who became emperor at the age of sixty-eight, punished the Nestorian and Eutychian heretics with severity, and in 527 resigned in favour of his nephew Justinian (q. v.), who married Theodora. The brilliant campaigns of Belisarius (q. v.) and Narses (q. v.) in the African, Italian, Persian, and Colchian wars, and the consolidation of the civil law by Tribonian and his colleagues, did not make Justinian's empire secure. The capital was torn by the faction fights of the Greens (Prasini) or Anastasian party and the Blues (Veneti) or orthodox party, to which the Emperor belonged. The terrible insurrection called Nika is said to have cost 30,000 lives. Unjust laws, the oppressive *anona*; the sale of offices, and the starvation of the army, spread discontent; and the appearance of the Lombards and the Avars rendered the N. frontier still more insecure. In 565 Justin II. succeeded. His weakness made his wife Sophia virtually supreme, and in 574 Tiberius, Captain of the Guard, was made Regent, and became Emperor in 578. After suppressing the conspiracy of Sophia and Justinian, Tiberius, who assumed the name of Constantine, made advantageous treaties with the Persians and the Avars, and in 582 chose as his successor Maurice, the Commander of the Legion of 12,000 Confederates. The latter continued the economical policy of Tiberius II., to the great discontent of the army; the inroads of the Avars prevented him from succouring the imperial cause in Italy against the Lombards, but in a successful Median campaign he defeated the usurper Bahram, and restored Chosroes to the throne of the Sassanids. Phocas, the centurion, succeeded in 602, Maurice falling a victim to faction-fury. The former was a monster of cruelty and ignorance, and in 610 Heraclius, the Exarch of Africa, who had never acknowledged the usurper, approached the capital with a small fleet, and on the murder of Phocas, was at once chosen emperor. He succeeded to the Persian war, which Chosroes, the conqueror of Syria and Egypt, had declared against Phocas, and in which the veteran Narses had refused to serve the empire. After seeing both Avars and Persians almost at his gates, Heraclius, borrowing largely from the Church, began in 622 the famous Six Campaigns, which by the careful drill of the troops and the religious enthusiasm inspired by the bravery and devotion of the Emperor, partly also by

Turkish aid, resulted in the overthrow of the Persian and of the Avar power, the evacuation by the Persians of Syria and Egypt, and the restitution of the true cross to the Holy Sepulchre. These territories were, however, at once seized again by the Arabs. Heraclius died in 641, and was succeeded by his son Constantine III., who reigned 103 days. The conspiracy of Martina and Heracleonas having been suppressed, Constans II., the son of Constantine, became emperor. He murdered his brother Theodosius, and retired to Syracuse, where he was himself murdered in 668, and succeeded by his son Constantine IV. (Pogonatus), in whose reign the Sixth General Synod of Constantinople was held. He defeated the Arabs, who were at this time under the rule of the Omniades, but was forced to pay tribute to the Bulgarians. From 685 his son Justinian II. (the destroyer of St. Maron's Monastery) ruled till 695, when the conspiracy of Leontius banished him to the Crimea. In 705 he was restored by the aid of the Bulgarians, but his cruelties excited a revolt, and in 711 he and his son Tiberius, the last of the Heraclian line, were assassinated.

The Isaurian Dynasty and its sequel.—The short and troubled reigns of Philippicus (Bardanes), Anastasius II., and Theodosius III., all elected sovereigns, led to the choice of Leo III., the Isaurian (from a district in Pisidia), who begins the Iconoclast Period (717 to 867). By some this is regarded as the true beginning of the Byzantine, as distinguished from E. Roman, Empire. Leo, by his defence of the capital against Moslemah and his defeat of Sid-al-battal, restored the imperial authority in Syria. He also reorganised the Themes, or provinces, over which he appointed Strategoi, and pursued a policy of centralisation even in the Church, in which he opposed images and pictures. His opposition to the Popes, Gregory II. and III., and the severity of his taxes, favoured the independence of the Italian dukes. He was the last of the B. emperors who confirmed a papal election. His son Constantine V. (Coprnomus) succeeded on the death of Leo in 741. After a struggle with his brother-in-law, Artavasdos, he secured his 'Romanian' frontier against the Saracens, carried on a successful aggressive war against the Bulgarians, suppressed the Skamars or outlaws, and extended to crucifixes the iconoclasm of his father. Leo IV., the Khazar (775-780), succeeded his father Constantine, and was himself succeeded by his son, Constantine VI., during whose reign the Empress-mother Irene obtained from the second Council of Nicaea the emphatic approval of 'reverence' for images. In 797 Irene, partly through the influence of the monks, dethroned her son, and retained power until 802; she desired a marriage with Charlemagne, who had been proclaimed Emperor of the W. In 802 Nicephorus, the Grand Treasurer, became emperor through a conspiracy. He arranged by treaty the division of Italy with Charlemagne, continued the unfortunate defence against Harun Al Rashid's mercenary incursions, and in 811 was killed in battle with the Bulgarians, who, as well as the Slavonic settlements S. of the Danube, were constantly troubling the empire. The reigns of Stauralos and Michael I. are unimportant. The cowardice of the latter in camp led to the elevation of Leo V. (the Armenian), General of the Anatolic Theme, who crushed the Bulgarian leader Crumu at Mescuria, adopted the 'Chameleon' or Toleration policy in the image question (which, however, was finally decided in favour of the military Iconoclastic party), purified the administration of justice, and was assassinated in 820. His assassin, Michael II. (the Stammerer), the founder of the Amorion dynasty, ruled till 829, in which period the empire lost Crete to the Spanish Arabs of Abou Hafs, and Sicily to the Aglabites, and suffered from a civil war begun by the rebel soldier Thomas. Michael persuaded the W. Church under Louis le Débonnaire to condemn images, as Charlemagne had previously done in the Caroline Books. His son Theophilus (829-842) owed much of his domestic policy to Patriarch Joannes, the Grammarian. The skill of his general, Manuel, could not avert the triumph of the Calif Motassem at Amorium. Under the regency of Theodora, a new Council of Nicaea restored image-worship (an event still celebrated in the Greek Church), and the persecution of the Paulicians produced a revolt.

The Macedonian Dynasty.—The disgraceful character of Michael III., and his uncle Bardas, who ruled down to 867, are a little relieved by the vigour of Photius, the Patriarch, who first threw off the authority of the Pope. They were succeeded by the chamberlain Basil I., the Macedonian, founder of the

Basilian dynasty, which endured till 1057, the period of greatest power and glory in the B. Empire. Basil's reign is marked by the publication of the Procheiron and the Revision, completed by the Basilike of Leo VI., codes of the Roman law as applied at Byzantium, which favoured the union of legislative, executive, judicial, and administrative power in the Emperor. Basil established the Theme of Longobardia in Italy, but his frontier in Cilicia was constantly harassed by Saracens and Paulicians. On his death in 886, Leo VI., the pedantic author of a work on military tactics, and the publisher of the 'Novels,' succeeded. His defeat at Crete, and the storming of Thessalonica by the Mohammedans, show unusual military weakness. His legitimated son Constantine VII., Porphyrogenitus, reigned feebly, first under the regency of Alexander, and with an interval of Romanus I. (920-944), but his leisure was employed on valuable historical works. His son, Romanus II., ascended the throne in 959. Affairs were conducted by Bringas, the minister, and Nicephorus II., Phokas, who was victorious in Crete, and who assumed the purple in 963. He recovered Antioch from the Saracens, but was drawn into hostilities with the Emperor Otho in Italy, and with the Hungarians and Russians. He was in 969 assassinated by John I. (Zimjskes), who married Theophania, his predecessor's widow, and ruled till 976, inflicting a severe defeat on the Russian Swiatoslaw at Durystolon, which quieted Bulgaria for some time. This advantage was extended by Basil II. (976-1025) expressively called Bulgaroktonos, the son of Romanus, who, after quelling the aristocratic insurrection of the two Bardas, conquered the new Bulgaro-Slavonic kingdom, which had been founded by the Bulgarian Samuel, and was assisted by the Wallachian Ladislav. Basil's Armenian and Aleppo campaigns were also successful. His brother, Constantine VIII. (1025-28), was incapable, and the government was conducted by eunuchs. The next four emperors, Romanus III. (1028-34), Michael IV. the Paphlagonian (1034-41), Michael V. (Kalaphates or the Caulker, 1042), and Constantine IX., Monomachus (1042-54), were all successively husbands of Zoe, the daughter of Constantine VIII. The fiscal oppressions of Joannes, the Orphanotrophos, the revolt of Servia under Stephen Bogislav, the brilliant but unavailing campaigns of Maniakes against the Saracens in Sicily and the Normans in Italy, the Russo-Varangian invasion of Vladimir, the conquest of the Armenian kingdom of the Bagratians, followed by the attacks of the Seljuk, Toghrul Beg, on that territory, and the final rupture of the Greek and Latin Churches, are the chief events of this period.

The Comnenian Dynasty.—The short reigns of Theodora (sister of Zoe) and Michael VI. (wrongly called Stratiotikos) gave place to the Paphlagonian, Isaac I. (Comnenus), who, after meeting an invasion of the Hungarians, retired to the monastery of Stucilion, resigning the throne to Constantine X. (1059-67), in whose reign Alp Arslan conquered Armenia and Iberia without Byzantine resistance. Constantine's widow, Eudocia, married Romanus IV. (Diogenes), who proved unequal to the task of defending Cappadocia against the Seljuks. In his reign, also, Guiscard the Norman captured the last imperial city in Italy (Bari). Michael VII., Parapinakes (1071-78), appointed Suleiman, an officer of Malekshah, governor over the territory of Roum, and thus made an important concession to Seljuk power. The reign of Nicephorus III. was broken by frequent rebellions, and at last Alexius I., Comnenus, whose mercenaries had sacked the capital, obtained the throne in 1081. His dynasty endured till 1185. His reign is marked by the Norman invasion of Illyria, the Patzinak war in Bulgaria, the First Crusade, and the gradual advance of the Seljuk power in Asia Minor. Joannes II., the Good (1118-43), was a successful soldier, but his son, Manuel I. (1143-80) disintegrated the imperial army, and suffered in consequence serious reverses in Phrygia. Court intrigues are supreme during the reigns of Alexius II. and Andronicus I. (1180-85). The murder of the latter ends the Comnenian dynasty. In Isaac II. (Angelos) and Alexius III., Angelos Comnenus (1185-1203), we see the rapid declension of the empire answering the rise of the Wallachian-Bulgarian kingdom.

The Latin Interregnum.—In 1203, on the suggestion of the German Emperor, and having received permission from Pope Innocent III. to plunder the E. Empire, the Doge Enrico Dandolo stormed Constantinople and reinstated Isaac II., with his son Alexius III. as colleague. The usurpation of Alexius V. (Murtzuphlos) was immediately followed by the

taking of the capital by the Venetians and Crusaders, after which, in accordance with treaty arrangements, Baldwin of Flanders became Emperor of Roumania, the Venetians obtaining territories on the Adriatic and Ægean coasts, and much of the Greek Empire being split up into principalities and dukedoms. The Belgian or Latin dynasty of Baldwin (including Henri, his brother, Robert of Courtenay, Jean III. of Brienne, the titular King of Jerusalem, and Baldwin II. endured till 1261, but was wholly unable to maintain the empire against the Rhodians and Epirotes on the one hand, and the Greek Empire of Nicea on the other. This Greek Empire was established by Theodore I., Lascaris, and strengthened by Joannes III., Vatatzes, who reigned 1222-54, allied himself with the Bulgarians, and received the submission of the pretended Emperor of Thessalonica.

The Dynasty of the Palæologi.—The short reigns of Theodore II. (1254-58) and Joannes IV. were succeeded by the able but unscrupulous Michael VIII., who, helped by the Genoese, captured Constantinople in 1261, and founded the dynasty of Palæologus, which endured till the final overthrow of the Eastern Empire in 1453. In 1204 a third empire had been established by Alexius Comnenus in Pontus and Paphlagonia, the capital being Trebizond. Under Michael, who reigned till 1282, the rebellion of the Nicean Greeks prepared the way for the Turks. Charles of Anjou threatened the empire on the W., and Michael became unpopular by his high-handed negotiation of the union of Greek and Latin Churches, which took place at Lyons in 1274. In the following reign of Andronicus II. (1282-1328), the empire suffered chiefly from the Catalan Grand Company, who had originally been hired to resist Othman the Turk. The Libertine, Andronicus III. (1328-41), was unable to prevent the Turks occupying Nicea and Nicomedia, and even ravaging Thrace and Macedonia. The reign of his son, Joannes V. (1341-91), including the regency of Anne of Savoy, the civil war and reign of Joannes Cantacuzenos, and the intervals of power of Andronicus, reduced the empire to the vassalage of the Sultan Murad I., who made Adrianople his capital (1361). Manuel II., the son of Joannes (1391-1425), sunk still deeper into dependence on Bayezid I., the victor of Nikopolis, and was left by Murad II. (who defeated the Hungarians at Varna) in possession of the capital, a few towns in the neighbourhood, Thessalonica, and a part of the Peloponnesus. The extreme weakness of Joannes VI. (1425-48) induced him at the Council of Florence (1439) to agree to the union of the Churches in the hope of military assistance which was not sent. His brother, Constantine XI. ('the last of the Palæologi'), fell in the final siege of Constantinople, which, along with Justiniani, he bravely but vainly defended against Mohammed II. (1453). The empire of Trebizond and the independent despots of Greece soon after submitted. So ended 'the premature and perpetual decay' of the B. Empire. See Finlay's *Hist. of B. and Greek Empires*, which also contains a description of the system of government by a privy council without senate; of the domestics of the palace; and of the provincial and military government. These form the subjects of the two works of Porphyrogenitus, *De Ceremoniis*, and *De Thematibus*.

Byzantine Historians may be divided into three classes:—

1. *General Historians*, who begin either with the Creation or the Christian era, but deal more in detail with B. history, such as Georgius Cedrenus; a monk of the 11th c., compiler of *The Chronicle Paschale*, or *Alexandrian Chronicle*, coming down to 1042 (edited by Ducange); and Michael Glypas, author of a *Chronicle* coming down to 1118.

2. *Special Historians*, who confine themselves to B. history,

or periods thereof, such as Nicolas Chalcondylas of Athens, whose history reaches the year 1462; Agathias, the poet, whose account of Justinian's reign from 553-559 is extremely sober and valuable; Anna Comnena, and Joannes Cinnamus, imperial notary, who have left accounts of most of the 12th c.; Joannes Cantacuzenos, who after abdicating wrote a B. history from 1320 to 1357; and Georgius Phranza, the historian of the Palæologi, from 1260 to 1477.* The history by Michael Pællus, the Prince of Philosophers, has been edited this year (1875) by M. Sathas.

3. *The Writers on Social Institutions*, &c., such as Prosopius, whose book, *De Edificiis*, refers to Justinian's time (he also wrote two contemporary histories); Joannes Laurentius, who describes the Roman magistrates of the same period; and the Emperor Manuel Palæologus, who left several works of interest. The Paris edition of 1645-1711, and the Venice edition of 1729, are both praised by Gibbon. But that begun by Niebuhr in 1828, and carried on by Bekker and others, is the most complete. Ducange has published valuable supplementary works—e.g., *The Greek Glossary*. See Schoell, *History of Greek Literature*.

Byzantines are the gold, silver, and copper coins struck by the various emperors of the East. Of these the chief are *nomisma* or *solidus* in gold, the *millaresion* and *keration* in silver, and five small copper coins, mounting in value, as 5, 10, 20, 30, 40. Since Justinian I., these coins contain the date of the reign, a letter showing where struck, generally a head of the sovereign, with some symbol, as a sword, &c., and the name of the sovereign and consort, or colleague. They sometimes indicate how far a usurper obtained authority. The *surfrappe*, where one head is struck over another, is especially valuable in chronology. The emperors frequently got rid of their debts by debasing the currency, and gave bad change to the Crusaders. This reached its climax in Andronicus II., who issued the byzant half gold and half alloy. The byzant was divided into *seminis*, *trimenis*, and *tetartem*, all gold. Finlay says that B. gold was in circulation from Scandinavia to India. The chief reformer of the currency was Anastasius I. The chief writers on these coins have been Ducange, Bon Marchant, Pinder and Friedland, and De Saulcy. It is noteworthy that Mahomet II. struck a coin at Constantinople, in which he calls himself 'King of all Greece and Anatolia.'

Byzan'tium was founded by the Megarians in 667 B.C. Its splendid and secure position on the Thracian Bosphorus gave it the command of the sea, and of the shores of Europe and Asia, and it speedily enjoyed great commercial prosperity. B. was for some time subject to Darius Hystaspes, from whom it was freed by Pausanias. In 408 it was taken by Alcibiades, but was recaptured in 405 by Lysander. In 390 Thrasybulus changed the government from an oligarchy into a democracy. In 356 B. again attempted to throw off the Athenian yoke, but in 340 gladly received the aid from Athens that enabled it to check the career of Philip. After much oppression by the Gauls, it became subject to Rome. In the civil war between Severus and Pescennius Niger (2d c. A.D.), B. was taken by Severus, and destroyed. He subsequently, however, rebuilt and embellished a portion of it; and when Constantine removed hither the seat of empire from the Tiber, under the name first of New Rome and afterwards of Constantinople, it became for a time the most august city on the earth.

* The works of the Emperor Constantine VII. (*Porphyrogenitus*, circa 950-1050) should also be mentioned.

C.



is a letter first appearing in the Latin alphabet, from which it passed to all the alphabets derived from the Latin. Its place corresponds to, and its sound or 'power' was originally the same as, that of the Phœnician and Greek *g*, as in *gold*. Not only do ancient inscriptions prove this, as when the beaked column in the Forum uses *macistratus*, *legiones*, *Cartaginiensi*, &c., for the later forms *magistratus*, *legiones*, *Carthaginiensis*; but more than one Latin author distinctly asserts it. It may be regarded as additional evidence that words like Caius and Cneius were written in Greek *Gaios*, *Gnaios*. At a very early period—the precise date is not known, but it was at least as early as the time of the kings—C lost its flat, guttural sound of *g*, and acquired that of the sharp, guttural *k*, which it continued to possess down to the 8th c. A.D. This was its sound before every vowel, and Romans not only pronounced the *c* in *casa* and *comes* as a *k*, but also in *Cicero* and *Cæsar*, as one may see from the Greek equivalents *Kikêrôn* and *Kaisar*. The modern German *Kaiser* also preserves a recollection of the fact. So long as Latin was spoken with any degree of care, the original 'power' of C probably continued unimpaired, but when the schools were closed, and the barbarians began to rudely use the language of the empire they had overthrown, change was inevitable, more especially as certain consonants before certain vowels betray a natural tendency to lose their distinct character. Thus C in *facio* yields, in the form of *fakyo*, a slight sibilant sound, so does *t* in *natio*, and *d* in *diurnalis*. If the tendency be allowed to go on unchecked, it will develop itself more and more, until *fakyo* will become *fashio* or *fassio*, *natio*, *nashio* or *nassio*, and *diurnal*, *journal*. Hence the modern pronunciation of C as *sh* or *s* before *i* and *e*. The same process (though the historical circumstances are quite different) offers a satisfactory explanation of the change in the pronunciation of C in our own tongue. In Old English it had the power of *k*; in later and modern English it is often *tsh*. Thus *ceap* (kyap), *ceorl* (kyorl), *ceosan* (kyosan), *cyr* (kyr), and *cyrc* (kirke), have become *cheap*, *churl*, *choose*, *char*, *church*. Romance influence has obviously been at work here, but the tendency is already seen in the Old English itself, in the difference between the *ceorl* of our forefathers and the harder *karl* of the Germans, and was in all likelihood only hastened by the ruin that befell the mother-tongue after the Norman Conquest. As a letter, C may be considered superfluous. It represents nothing that is not represented by *k* or *s*; but its existence is part of history, and therefore not lightly to be dispensed with. For a notice of the various changes which it undergoes, see FRENCH LANGUAGE AND LITERATURE, and ROMANCE LANGUAGES AND LITERATURE.

C, in music, the name of one of the notes of the gamut, the major scale of which is given by the white keys on the piano-forte. If we suppose the inaudibly low note which corresponds to one vibration per second to be a C, the middle C of the piano will make 256 vibrations in the same time, and there are many reasons for fixing upon this as the standard pitch; but the pitch commonly used here in concerts corresponds to a middle C vibrating 263 times per second.

Ca'ing Whale (*Globiocephalus*, or *Phocæna globiceps*), a species of *Cetacea*, included in the family *Delphinida*, and forming the type of the genus *Globiocephalus*, but at other times regarded as forming a mere species of the Porpoise genus (*Phocæna*). This animal—not a true whale, zoologically considered—is occasionally known as the 'Round-headed Porpoise,' and

as the 'Bottlenose Whale.' It frequently occurs off the Orkney and Shetland Islands, and may attain a length of from 15 to 24 feet. These animals are gregarious in habits, and afford an oil, for which they are hunted. The head is very convex and rounded, as also is the muzzle. The body is thickened, the tail being forked. A single dorsal fin exists. The forelimbs, existing in the form of fins, are elongated and narrow. The general colour is black, the under surface of the body being streaked white. The skin is smooth, and destitute of hairs. The food consists of fishes, cuttlefishes, and similar organisms. When one of these forms runs ashore, the whole herd generally follows, and large numbers are sometimes thus captured—their name 'ca'ing,' or 'driving,' being derived from this circumstance. 1110 of these whales were captured in 1809 at Hvalfjord, in Iceland.

Cabal', a word supposed by some to be the same as the Hebrew *Cabbala* (q. v.), and therefore meaning a secret teaching known only to the initiated, but this derivation is more than doubtful. Its proper application is to a small party secretly united to attain its ends by faction or intrigue. The Cabinet of Charles II., in 1671, known as the C., was composed of five persons, the initial letters of whose names, by 'a whimsical coincidence,' says Macaulay, 'made up the word C.: Clifford, Arlington, Buckingham, Ashley, and Lauderdale.'

Cab'ala, Cabb'ala, or Kabbala (Heb. 'that which has been received'), according to the Jewish account, was the mystical interpretation of Scripture which was received from God by Adam, Abraham, and Moses, and handed down through Joshua to the seventy elders and their rabbinical successors. Of the C. in this sense there are three kinds: 1. *Gematria*, by which a meaning is found for words by taking other words whose letters, according to the numerical value of the (Heb.) alphabet, amount to the same number. Thus the letters of 'Shiloh shall come' and of 'Messiah' both represent 358, therefore Shiloh means Messiah. 2. *Themura*, by which the first letter of the alphabet was exchanged for the last, the second for the second last, and so on. Thus, 'In the beginning' becomes 'the first of Tisri,' therefore the world was created on that day. 3. *Notarikon*, by which a word is made to indicate a number of words, of which words its letters are the initials. Thus the letters of Ad(a)m form the initials of Adam, David, and Messiah; therefore the soul of Adam became David's, and then the Messiah's. The C. is divided into two branches—*Mercaba* (chariot, Ezek. i.), which treats of the perfections of God and the celestial intelligence; and *Bereshith* (in the beginning, Gen. i. 1), which treats of the material universe. The most important of the cabalistic writings are the *Sepher Yetzira* (Book of the Creation), and *Sepher Zohai* (Book of Splendour), written probably by R. Akiba and R. Simeon Ben Jochai respectively. See Gardner's *Faiths of the World*.

Caballe'ro, Fernan, is the *nom de plume* of Cecilia Böhl von Faber, the daughter of a German merchant, who died at Cadiz in 1836. She was born, during a visit of her parents to Switzerland, at Morget in 1797, was educated in Germany, returned to Spain in 1813, and has had a somewhat chequered career. She has been thrice married, and, although inheriting literary tastes from her Spanish mother, who was an authoress of note, only commenced her career as a writer in 1849, at the mature age of fifty-three. It is scarcely less remarkable that one who began so late should have almost at once attained a foremost place in the works of Spanish novelists. In keen perception of the peculiarities of the national life, in genuine national feeling, in originality of treatment, and in a fine idyllic grace of

description, she is unsurpassed. Her first work was *Gaviola* (1849). It was followed by *Elia*, *Clemencia*, *La Familia de Alvarado*, *Cuadros de Costumbreros Populares Andaluces*, and many others. She has published a collected edition of her works (*Obras Completas*) in 17 vols. (Mad. 1860-66). She died 7th April 1877.

Cabanel, Alexandre, a French painter, born at Montpellier, 28th September 1823. He travelled to Rome, and gained prizes at Paris in 1845, 1852, and 1855. Among his works are 'The Agony of Christ in the Garden of Olives,' 'The Death of Moses,' 'The Christian Martyr,' 'Othello relating his Battles,' 'Michael Angelo,' 'Aglaia,' 'Velleda,' and a series of designs representing the twelve months of the year, 'The Birth of Venus,' and 'Adam and Eve.' He was made a member of the Académie des Beaux Arts in 1863, and an officer of the Legion of Honour in 1864.

Cabanis, Pierre Jean Georges, born at Cónac, near Brives, 5th June 1757. After a stay at Warsaw in a situation as private secretary, he settled down as literary man and medical man in Paris, where he had studied. A moderate reformer, he was the friend of De Tracy and Mirabeau, the latter of whom he attended on his deathbed: he acted successively in the Council of Five Hundred and the Senate, and was finally made Director of the Paris Hospitals. He died 6th May 1808. His great work, *Rapports (Traité) du Physique et du Moral de l'Homme*, originally read as Mémoires before the Institute in 1798-99, was published in 1802 (new ed. 1855). Declining to recognise an essential difference between life and mind, and dissatisfied with the meagre theory of Condillac, C. sets himself to show 'how sensations are modified by modifications in the organs; how ideas, instincts, passions, are developed and modified by the influences of age, sex, temperament, maladies.' His attempts to analyse certain instincts were crude, but he is not guilty of the absurdity that 'thought is a secretion of the brain.' He merely meant that thought was a function of the brain. C.'s *Œuvres* were published at Paris in 5 vols. (1823-25).

Cabatuan, a town in the island of Panay, Philippines, Malaysia, on the Tiguan, has considerable trade in rice, cocoa-nut oil, wax, and ebony. It was founded in 1732, but its situation is unfortunate. The river, which is at times scarcely navigable, swarms with crocodiles. Pop. 23,000.

Cabazera, a town in the island of Luzon, Philippines, Malaysia, has some manufacture of tobacco. It is capital of the province of Cagayan. Pop. 15,000.

Cabbage (*Brassica oleracea*), a plant used for culinary purposes, and for feeding cattle, extensively cultivated in this country and in nearly every temperate region of the globe. It is found wild on the rocky shores of Britain, and the S. of Europe generally, but in a very stunted condition. Kale or Greens—*Boracole*, *Colswort*, *Savoy*, *Kohl Rabi*, *Cauliflower*, and *Broccoli* (all of which see)—are some of the best known varieties into which it will 'sport' under cultivation. The *Common* or *White C.* is the variety most used for the table, while the *Red C.* is used for pickling. In the Channel Islands and the N. of France the *Tree* or *Cow C.* is cultivated for feeding cattle. It has a branching stem, and will reach a height of 10 feet. The *Portugal* or *Tranxuda C.*, or as it is also sometimes called, the *Couve Tranchuda*, is a delicate variety, with large midribs, which are sometimes used as a substitute for sea-kale. In cultivation the C. requires a rich soil, well manured, and frequently disturbed about the roots. By sowing at different seasons a succession can be had throughout the summer. It is not a very nutritious vegetable, containing about 90 per cent. of water. The raw C. is more digestible than the boiled—the first taking two and a half hours (or with vinegar, two hours), the other four and a half hours to digest. See SAUER-KRAUT.

Cabbage Bark. See ANDIRA.

Cabbage Butterfly, a genus of butterflies, so named from their larvæ or caterpillars feeding on the leaves of cabbages and other plants of the natural order *Crucifera*. The large white C. B. (*Pontia Brassicae*) is a familiar tenant of our gardens in summer, and is known by its white wings, which are spotted and

fringed with black. The wings may attain an extent when expanded of from 2 to 3 inches. The eggs, of a yellow colour, are deposited in numbers on cabbages, &c., and the caterpillars average from 1 to 1½ inches in length. They suspend themselves by a silky thread from walls, and are thus transformed into pupæ, from which during the same summer, or in the ensuing spring, the perfect insects appear. The small white C. B. or turnip butterfly (*P. Rapæ*) is of smaller size than the preceding form; its caterpillars boring into the hearts of vegetables, and being coloured pale green with a yellow dorsal line, and an interrupted yellow line along each side; while the pupa or chrysalis is reddish brown speckled with black. The green-veined white butterfly (*Pontia Napi*) closely resembles the latter species in appearance.



Cabbage Butterfly.

Cabbage Fly (*Anthomyia Brassicae*), a species of the *Diptera* or Fly order of insects, the larvæ of which burrow in cabbage and turnip roots. Nearly allied to this form, and included in the same genus with it, are flies of similar habits—such as the Turnip Fly (q. v.), Beet Fly (q. v.), &c. The C. F. is grey coloured, the face being silvery grey, whilst the males have a black line or mark on the forehead. The male abdomen is of narrow similar diameter throughout; that of the female being conical in conformation. The male averages ¼ of an inch in length, and the wings about ½ an inch in extent. The pupa is reddish coloured.

Cabbage Moth (*Noctua Brassicae*). The larvæ of this moth feed on the leaves of cabbage and turnip plants. These moths belong to the tribe *Noctuina* (*Lepidoptera*), the members of which are nocturnal in habits; the caterpillars being naked, and provided with sixteen feet, whilst the pupæ are enclosed in a loose cocoon. The moth is of a general rich brown colour.

Cabbage Palm, or **Cabbage-Tree**, a name given to the terminal bud of different species of palm, which is eaten like a cabbage. Thus the C. P. of the W. Indies is *Areca oleracea*, that of the Southern United States is the Palmetto (*Chamarops Palmetto*), while the Australian C.-T. is *Corypha australis*, the leaves of which are made into plait for hats, baskets, &c. The name C.-T. is also applied by gardeners to *Kleinia nerifolia*.

Cabbage Wood. See ERIODENDRON ANFRACTUOSUM.

Cabei'ri, certain mysterious deities worshipped as tutelary genii in Lemnos, Samothrace, and other localities in Greece. The service (*Cabeiria*), with its mysteries, festivals, and orgies, was found also in Egypt, Phœnicia, and Asia Minor. The C. were represented as dwarfs, and being adepts in metallurgy, they were called the sons of Hephestos. The origin and progress of this worship has been investigated by Lobeck (*Aglaopham.*, pp. 1202-81), but the subject is involved in great obscurity, as those who took part in the mysteries were strictly prohibited from divulging them.

Ca'bes, or **Khabs**, Gulf of (the *Syrtis Minor* of the ancients), a broad and deep inlet of the Mediterranean Sea, on the coast of Tunis, N. Africa. The reports of the ancients as to the cloud-like masses of sand, raised on its shores by the wind, which often overwhelmed men and even ships, have been confirmed by modern travellers.

Cab'et, Etienne, a French writer on communism, was born at Dijon, January 2, 1788. He began political life as a Carbonarist, and in 1833 started in Paris a Radical paper, *Le Populaire*. An article in this journal caused him to be sentenced to imprisonment for two years. C. fled to London, where he continued his journal, and developed into a pure communist. As such, he published numerous articles, pamphlets, and books, including a *Histoire (prétendue) de la Révolution de 1830*. The most remarkable of these communistic works was the *Voyage en Icarie* (1840, 5th ed. 1842), a Utopian romance, which was so popular among the working classes of Paris that C. obtained a considerable following, and was able to send out an 'Icarian

colony' to Texas in 1848. This experiment failed; but, nothing daunted, he went out to the United States with a second division of colonists, and established himself at Nauvoo, in Illinois, from which the Mormons had been expelled, in 1850. There he ruled as a sort of doctrinaire-dictator till 1856, when he was removed by a revolution, and had to flee to St Louis, where he died, 9th November of the same year.

Cabe'na del Buey ('Ox-head'), a town of Spain, province of Badajoz, 57 miles N.N.W. of Cordova by railway; has some trade in woollen and cotton goods, corn, and cattle. Pop. 5400.

Cabeza del Negro ('Negrohead'), the Columbian name for the front of *Phylephas macrocarpa*, the hard alburnum (or endosperm) of which constitutes 'vegetable ivory.'

Cabezón de la Sal, a town in the province of Valladolid, Spain, lies on the Pisuegra, 7 miles N.N.E. of Valladolid, and is notable for an early action (1808) of the Peninsular war, in which the French gained an easy victory over the Spaniards.

Cab'in (Fr. *cabane*, from Low. Lat. *capanna*, 'a small cot'), the nautical term for a room or apartment. In ships of war, the cabins of the officers below the captain, and the 'state-cabins' of the admirals and captains, are enclosed by a light panelling, which is removed when the ships are preparing for action.

Cabinet (Fr. *cabinet*, 'a chamber'), literally a diminutive of Cabin (q. v.), but of much wider signification, is applied, among many other meanings, to a room in which pictures, statuary, articles of *virtu*, antiquarian specimens, natural curiosities, models, and other treasures are kept. The term is also applied, both in France and this country, to the collections themselves which are exhibited in a C., or even in a gallery or galleries. The phrase, *C. picture*, means a small work of art so carefully finished in all its details as to successfully endure minute examination.

Cab'inet. See MINISTRY.

Cable (Low. Lat. *caplum*, from *capulum*, 'a cord or halter'), a large rope chiefly used for the anchors of ships. It is generally made of hemp twisted in such a way (see ROPE) that it has no tendency to unwind itself. The standard length of a C. is 120 fathoms, and its size is generally given by stating its circumference, which varies from 3 inches to 2 feet. The direct pull which will break a 10-inch cable is about 28 tons; for other sizes it varies as the square of the circumference. The enormous cables which at one time were used for large vessels are now to a great extent superseded by chains or chain-cables, which can be much more conveniently handled, and possess other advantages. They consist of oval welded links of wrought iron, each link being generally fitted with a little cross-piece or stud to prevent its sides being drawn together by the pull upon it. A stud chain has rather more than three-quarters of the tensile strength possessed before working by the iron of which it is made; an unstudded chain only about half of the original strength.

C. is also the technical name of the metallic core surrounded by insulating material, now of such importance in oceanic telegraphy. See TELEGRAPH, SUBMARINE.

Cable-Moulding, in architecture, a feature of the later Norman style, consisting of the carving of a rope with the twisting prominent.

Cab'ling, a feature of classical architecture, seen in the moulding by which the hollow parts in the flutes of columns and pilasters are partially filled.

Caboché', or Cabossed' (Old Fr. *caboché*, a diminutive of Lat. *caput*, 'the head'), in heraldry, is the head of a stag, or other animal, represented full-faced, and so as to show the face only, without any part of the neck.

Cabomba'oes, the Water-shield order, a natural order of plants belonging to the class Dicotyledonous. They are mostly aquatic, with floating peltate leaves. There are only three species in the order, found in America, Australia, and India. They have no important properties—*Cabomba* and *Hydropeltis* are the only genera.

Caboosse', or Camboose (Ger. *kabuse*, 'a little room'), the name of the cook's room in a merchant ship; also, a cast-iron cooking-stove on the deck of coasting vessels.

Cab'ot, John, a sailor of Venetian descent, who had settled at Bristol, obtained in 1496 from Henry VII. five vessels for an expedition of discovery. C.'s idea was to find a N.W. passage to China. He touched at Newfoundland and Labrador, coasted down to Cape Florida, then returned to England in 1497. He was accompanied by his son, **Sebastian C.**, born at Bristol in 1477, who also assisted his father in successive voyages (1498-99) under royal patent, probably to Newfoundland and the Gulf of Mexico. In 1512, C. retired to Spain, where Ferdinand gave him a post in the Council of the Indies. Returning to England on the death of Ferdinand, he was sent, in 1517, by Henry VIII. on a voyage to Labrador along with Sir Thomas Perte: they probably entered Fox Channel to the N. of Hudson's Bay. Subsequently C. sailed to the Brazil coast, but soon entered the service of Charles V., who made him Pilot-Major of Spain. In this capacity he assisted at the conference (1524) which adjudged the Moluccas to lie beyond the Portuguese division of the New World. In 1526, C. led an expedition up the La Plata river, and founded a small colony, Rio Tercero, afterwards destroyed, as much by the jealousy of the Portuguese as by the force of the natives. In 1546-48, having passed the interval in Spain, he once more returned to England, where he received a pension of £166, with the post of Grand Pilot, and took great pains in superintending the arrangements for the expeditions of Willoughby and Chancellor (1553), and Burroughs (1556), which, though they did not make out a N.E. passage, opened up, through the Muscovy Company, the Russian trade in fur, oil, &c. C. died at London in 1557. He left a notable 'Geographical Chart' and accounts of his voyages. See *Memoir of Sebastian C.* (Lond. 1831).

Cabotz', another name for Kousoo (q. v.), or *Brayera anthelmintica*.

Cab'ra (anc. *Agabrum*), a town of Spain, province of Cordova, 12 miles S.E. of Montilla, with manufactures chiefly of woollens, linens, soap, hosiery, bricks, and earthenware. Pop. 12,000. The district is famed for its wine. There are several other small Spanish towns of the same name.

Cab'ral or Cobre'ra, Pedro Alvarez, a Portuguese navigator, and the discoverer of Brazil, was born of a patrician family in the latter part of the 15th c. He married Isabel de Castro, first maid of honour to the daughter of João III., and was appointed by King Emmanuele of Portugal (on the recommendation, it is said, of Vasco de Gama) commander of a fleet of thirteen sail and 1200 men, bound for Calicut to re-establish the Portuguese interest there, 9th March 1500. Contrary to his wish, his fleet was carried S.W. across the Atlantic, and on the 24th April he discovered Brazil, and took the land in the name of his king. Sailing thence for India, he reached Calicut, conquered the enemies of the Portuguese, founded a factory, and negotiated a treaty—the first—between Portugal and India. Returning with much booty, he arrived at Lisbon, July 31, 1501. Although his discoveries added the splendid appanage of 'the Brazils' to the Portuguese possessions, the King seems to have been too ignorant of his new territory to be satisfied with C.'s expedition; for, from this time till his death, in 1526, his name is not mentioned among Portuguese navigators. See Ramusio's *Navigations* (Ven. 1835).

Cabre'ra, Don Ramon, Count of Morella, Duke de la Victoria, formerly a noted Carlist chief, was born at Tortosa, in Catalonia, 31st August 1810. On the death of Ferdinand and the outbreak of the civil war in Spain, C. joined the Carlists or Absolutists, and his fiery energy and military skill soon gained him a leading command. On two occasions he nearly succeeded in securing the triumph of Don Carlos—in 1837, when he beat the royal troops in two battles, to be, however, himself beaten in a third; and in 1839, when he threatened Madrid. The desertion of the Carlist General Marotto, however, ruined the cause; and in 1840 C. was driven out of Spain and took refuge in France, where, for a time, he was imprisoned in the castle of Ham. Regaining his liberty, he took up his residence in Lyon. He was opposed to the abdication, in 1845, by Don Carlos of his pretensions in favour of his son; but in 1848 he took advantage of the French Revolution to attempt a fresh Carlist rising. He was, however, beaten and severely wounded in the battle of Pastoral, January 27, 1849. After this, he removed to London, where he married a rich English

lady, Miss Marianne Catharine Richards. In the numerous Carlist attempts subsequent to 1848, C. has taken no part, and when, in 1875, a military *pronunciamento* overturned the republic of which Marshal Serrano was the head, and placed Alphonso XII. on the throne of his mother Isabella, he issued a manifesto advising the Carlists to submit. C. died at Staines, 24th May 1877.

Cabrit, a name sometimes applied to the prongbuck or pronghorn antelope of N. America (*Antilocapra furcifera*). See PRONGBUCK.

Cabul' (ancient *Cabura*), the capital of Afghanistan, and also of the Afghan district of the same name, lies near the junction of the C. and Logar rivers, 6300 feet above the sea, in a triangular hollow, and is enclosed by mountains on three sides. It was formerly surrounded by high mud-walls, which have given place to a belt of orchards and gardens. Two of the old gates, of deeply-coloured kiln-burnt bricks, are still standing. The town is divided into quarters (*mahalas*), the streets are dirty and irregular, and the only buildings of any pretension are a few mosques, some fifteen caravansaries, and several large bazars, of which one especially, about 600 feet long, is regarded as a triumph of Eastern architecture. Much of the town has remained in ruins since its capture by the English in 1842. On a rocky eminence to the S.E. of C. stands the fort of Bala-Hissar, and on the slope are clustered the royal palace and gardens, a large bazaar, and many private dwellings, within the protection of a wall and ditch. The town is wholly commanded by the hills, which are steep, rocky, and bare. C. lies on the Indo-Persian caravan route, and is an important centre of commerce. Heavy duties are here levied on merchandise. C. has a growing trade with Russia, from whence it receives broadcloth, silk goods, velvets, paper, gold and silver lace. It has extremely cold winters, and the temperature ranges in summer from 75° to 85° F. The river C. is here crossed by four substantial bridges. To the S. of the town is the monumental tomb of the Sultan Baber, who made C. the capital of the Mogul empire. Pop. 60,000, of whom many are Armenians and Jews. Within the present century C. has been the scene of memorable events. Accompanied by an English force, Shah Sujah made his state entry into the city, August 7, 1839. The English remained here without hindrance till November 2, 1841, when rebellion broke out, and the garrison was subjected by Akbar Khan to a siege which lasted till the 6th January following. The remnant of the force, comprising 690 British, 3810 Indian native troops, and 12,000 followers, were then allowed to march out, and begin the terrible retreat through the Khyber Pass, a retreat which left only one survivor. A British army, under General Pollock, took possession of the Bala Hissar without opposition, September 15, 1842, and remained here until 12th October, when it withdrew, after destroying several of the most important buildings.—O., or *Cabulistan*, a division of Afghanistan, in the basin of the C. river, is bounded N. by the Hindu Kush and Kafiristan, W. by the mountains of the Paramisus and by Herat, S. by Candahar, and E. by Peshwar and other Anglo-Indian districts on the right bank of the Indus. It is in part arable, and yields wheat, barley, sugar, and coffee. It is governed by a chief, and the revenue amounts to £180,000. The army, the strongest in Afghanistan, comprises 9000 horse and 2000 infantry.—The O. River rises in the Hindu Kush, at a height of 8400 feet above the sea-level, and flows E. through the part of Afghanistan to which it gives name, joining the Indus at Attock, after a course of 320 miles. It is navigable to boats of 50 tons from Duobandi to Attock. The Valley of the C., or the C. Pass, part of which is called the Khyber Pass, forms the famous western highroad to India, traversed by Alexander the Great, Timur, Baber, and Nadir-Shah. See AFGHANISTAN.

Caca'lia, a genus of plants of the natural order *Compositae*, natives of the warmer parts of America, Middle Asia, and Eastern Africa. The Chinese employ the leaves of *C. procumbens* as food, and those of *C. ficoides* of the Cape of Good Hope are also wholesome.

Caca'o. See COCOA.

Cacca'mo, a town in the province of Palermo, Sicily, 21 miles S.E. of the city of Palermo. Pop. about 6000.

Ca'cesra (the *Castra Cecilia* of the Romans), capital of the province of the same name in Spain, 53 miles N.E. of Badajoz,

and 25 miles W. of Truxillo. It is the emporium of the district trade in bacon; much fruit is grown in the neighbourhood, and the town has manufactures of woollens, linen, leather, &c. The Plaza contains some interesting remains of sculpture. Pop. 10,000.

Caceres, Nueva, a town in the island of Luzon, one of the Philippines, in the province of Camarines, 180 miles S.E. of Manila, has a pop. of 12,000.

Cach'alot, or *Sperm Whale* (*Physeter macrocephalus*), a genus of Cetacea, representing the family *Physeteridae*, or *Catodontidae*, the members of which are distinguished by the absence of baleen or whalebone plates, by the lower jaw possessing conical-pointed teeth; the upper jaw also possessing teeth, which, however, with one partial exception, do not cut the gum. The head in the S. W. is very large, averaging about one-third of the length of the body, the muzzle being broad and square, or truncated, and possessing the nostrils or 'blow-hole' on its front surface. The females are smaller than the males, which may measure from 50 to 70 feet in length. The teeth number about fifty-four, and are situated in a common (*alveolar*) groove, imperfectly divided into different and separate *sockets*, or *alveoli*. These whales are gregarious in habits, and inhabit the N. Pacific Ocean more particularly, but also occur occasionally in the Mediterranean and other European seas. The colour of the body is black, or very dark grey on the upper, and lighter on the under parts. It tapers towards the tail, which terminates in a horizontal tail-fin, divided into lobes. The fore limbs, represented by swimming-paddles, are of small size. A small or rudimentary dorsal fin exists.

These whales derive their popular name from their affording *Spermaceti* (q. v.), a fatty substance which solidifies when exposed to the air, and which is extensively used in commerce. This substance is contained within special cavities or *sinuses* of the frontal parts of the skull. The substance known as *Ambergris* (q. v.), supposed to be a *gall-stone*, and used in the manufacture of perfumes, is found in the intestines of these whales. The *sperm-oil* obtained from the blubber is very valuable, and does not possess the peculiar odour of common whale-oil derived from other species.

These animals feed upon cuttlefishes, pteropodous and other mollusca, and allied forms. The older males are known as 'bulls,' and are said to be distinguished by a greyish spot on the front of the head or muzzle. The young males are met with in herds by themselves, the older males being generally solitary in habits. These whales are said to engage in fierce combats, presumably for the possession of the females. The only other species of this family and genus included in the Whale order, is the *Physeter tursio*, or high-finned S. W. or C., so named from its possessing an elevated dorsal fin. The name *Catodon* is sometimes substituted for that of the genus *Physeter*.

Cacha'o, an important city of Anam, capital of the province of Tonquin, on the Tonquin river, about 90 miles from the sea. It stands in an open space, is built chiefly of mud and timber, and does a large export trade in gold, lackered ware (the finest in the East), and splendid silks. As far as C. the river is navigable for small vessels. Pop. said to be about 100,000.

Oache (Fr. 'a hiding-place'), a hole in the ground, usually 6 or 8 feet deep, and several feet broad, for concealing provisions and other articles which it is inconvenient to carry. Travellers over the great prairies of the United States, who mean to return on their tracks, dig such holes, bury their property, and carefully cover it over to hide it from the Indians.

Oachet, Lettres de. See LETTRES DE CACHET.

Oache'xia, a name used in medicine to denote a peculiar vitiated state of the constitution, in which there is great weakness, with or without the local manifestation of some constitutional disease. C. is not itself a disease, but rather a depraved state of the body, the result of some serious malady. It is derived from Greek words signifying 'to have an evil habit of body.' Physicians speak of various C., the chief of which is the cancerous C. (see CANCER), characterised by a peculiar yellow skin, contracted features, desponding look, combined with the expression of great suffering, so characteristic of cancer, and so familiar to medical practitioners.

Cachibou, or **Ohibou Resin**, a fragrant gum resin, obtained from *Bursera gummiifera*: that from *B. acuminata* is known in commerce as the resin of Carana.

Cachoeira, a town of Brazil, in the province of Bahia, on the river Paraguaçu, and about 60 miles N.W. of Bahia, the capital of the province. There are in the neighbourhood of C. extensive sugar and tobacco plantations. Pop. 25,000.

Cachrys, a genus of plants of the natural order *Umbellifera* (*Apiaceæ*), natives of the S. of Europe, Siberia, &c. The Cossacks chew the seeds of *C. odontalgica* as a remedy for toothache, the effect being probably owing to the salivation produced. Several species are cultivated.

Cacique, or **Cazique**, a king or chief among some tribes of Indians in Central America.

Cocoa. See COCOA.

Cocodæmon. See DEMON.

Cacodyle, or **Kakodyle**, is a compound of Arsenic (q. v.) with the hydrocarbon radical methyl (CH_3), and has the composition expressed by the formula $\text{As}_2(\text{CH}_3)_4$. It is the principal ingredient of *Cadet's fuming liquor* or *alkarsin*—a spontaneously inflammable liquid obtained by distilling a mixture of arsenious acid and acetate of potassium. C. is an extremely poisonous substance, of a most disgusting odour (whence its name), and is spontaneously inflammable: it combines with oxygen, sulphur, chlorine, &c.

Cacongo, a district on the W. coast of Africa, immediately N. of the Congo river. The coast is flat and unhealthy; but more inland, where the chief town (Kinguela) lies, the country is higher, and has a fine climate and luxuriant vegetation. C., however, has been but little explored. A. Bastian's travels, in 1873 (see *Die Deutsche Expedition an der Loango-Küste*, &c.), were confined very much to the coast region.

Cactaceæ, the Cactus or Indian Fig order, a natural order of plants belonging to the class Dicotyledons—succulent plants, usually spiny and leafless. They are natives exclusively of the tropical regions. There are about 800 species, belonging to eighteen genera—e.g., *Melocactus*, *Mammillaria*, *Cactus*, *Opuntia*, &c. The acid fruits of many of them are used in febrile complaints, and those of a New Mexican species (the 'Pitahaya') form a considerable source of food to the native Indians. The fleshy stems of the melon cactus (*Melocactus*) is eaten by cattle in S. America, and many others are cultivated for their showy flowers. The fruit of the prickly pear (*Opuntia vulgaris*) is now imported into this country from the S. of Europe, where it is much eaten as a dessert fruit. *O. cochinillifera*, the Nopal plant, is cultivated in Mexico, Teneriffe, &c., for the nourishment of the cochineal insect (*Coccus cacti*, q. v.). Some of the plants grow to a great size. *C. Peruvianus* of S. America has a stem 30 to 50 feet in height, and 1 to 2 feet in diameter. *C. Thurberi* has a stem 10 to 15 feet high. The spines and bristles on a plant of *Echinocactus platyceras* have been reckoned at 51,000, and those on one of *Pilocereus senilis* at 72,000.

Cadaiba, a name applied to a genus of plants of the natural order *Capparidaceæ*, natives of Africa, India, and Australia. The roots of *C. Indica* are aperient and anthelmintic.

Cadamba, or **Kudumba**, is a name applied to the wood of several species of *Naslea*, a genus of trees of the natural order *Cinchonaceæ*, natives of the E. Indies. The wood of *N. Cadamba*, a fine tree, is soft, yellow, and fine-grained, and is used for various purposes. *N. cordifolia* is used for packing-boxes, flooring planks, &c.; but this wood, like that of the rest

of its genus, is liable to be injured by damp, and can only be used in a dry place.

Cada Mosto, or **Oa da Mosto**, **Alvise** or **Luigi**, a famous voyager and discoverer on the W. coast of Africa, was born at Venice about 1432. Entering the service of Dom Henriquez, the Infanta of Portugal, he sailed from Lagos on March 22, 1455, visited the river Senegal, and traded along the coast of that region in gold and slaves till, after being joined by two other Portuguese ships at Cape Verde, he sailed southwards and discovered the Gambia. C. then returned to Portugal. In the following year (1456) he discovered the Cape Verde Islands, and the rivers Cazamanza and Rio Grande, after which he returned to Portugal, where he remained till the death of the Infanta in 1463. C. died about 1480. The first account of his voyages, now a very rare book, was published at Vicenza in 1507, under the title *El Libro de la Prima Navigazione per Oceano a le Terre de Nigri de la Bassa Ethiopia*. See Zuria, *Dei Viaggi e delle Scoperte Africane di Cada Mosto* (Ven. 1815).

Cadaveric Rigidity. This is the stiffness of death or *rigor mortis*. Immediately after death there is a general relaxation of the whole muscular system. The joints are flexible, the lower jaw drops, the upper eyelid falls over the globe of the eye. Five or six hours after death this relaxed condition gives place to one of rigidity. The muscles stiffen, and the body for a time maintains the position in which it happened to be when death occurred. Still later, the muscles again become relaxed, and putrefaction sets in. C. R. is due to a change occurring in the muscles. During life the contractile material in muscular tissue is semifluid; after death it tends to coagulate slowly, and when coagulation is complete, the result is C. R. In warm-blooded animals muscular contractility requires a frequent supply of arterial blood. If this be arrested, the muscle gradually loses its contractile power and tends towards C. R.; but, as Brown-Séquard has shown, even after C. R. has made its appearance, it may be removed by the injection into the vessels of warm arterial blood. This physiologist succeeded in removing C. R. from the muscles of the decapitated body of a criminal thirteen hours after death, and two hours after the body had become stiff, by injecting warm human blood from which the fibrine had been removed.

C. R. may come on even while the body is warm. The time of its appearing depends on the state of vitality of the muscular system. The bodies of persons who have died of exhaustive diseases, such as typhoid fever or phthisis, cool rapidly, and C. R. quickly supervenes; whereas the bodies of strong muscular individuals who have died from acute and rapid disease, or who have been cut off by accident, cool slowly, and C. R. may not appear till after the lapse of ten or twelve hours. It is also a general fact that if C. R. comes on soon after death it lasts only a short time, and gives way to putrefaction; while, on the other hand, if it does not appear till many hours after death, it lasts comparatively a longer time. The duration of C. R. is modified by the state of the air. Dry, cold air delays its disappearance; warm, humid air hastens it. It begins almost invariably in the muscles of the neck and lower jaw. For further information, see DEATH, and *Principles and Practice of Medical Jurisprudence*, by Alfred Swaine Taylor, M.D., &c. (Lond. 1873), vol. i. p. 53 et seq.

Caddice or **Caddis Fly** (*Phryganea*), a genus of insects belonging to the order *Neuroptera*, and to the sub-order *Trichoptera* ('hairy-winged') of that group. These forms possess four wings, with branched *nervures* or supporting ribs, the front pair being hairy, and the hinder pair folded in repose. The organs of the mouth, with the exception of the palpi, are abortive; the head being small, and provided with two large compound eyes, three ocelli, and elongated antennæ or feelers. The eggs are deposited in water, the larvæ being aquatic, and forming the familiar *Caddis-worms* of anglers. They are soft-bodied grubs, possessing six feet, and are armed with jaws. They protect their bodies by enclosing them within cases formed of pieces of straws, pebbles, shells, and other heterogeneous materials,



Caddis-Fly.

united by silky threads. These cases are enlarged by the larvæ cutting off the hinder extremity of the case, and adding to the front. The larvæ move about freely by pushing with the head; the front segments being provided with legs. The larva passes to the pupa state by fixing the case, and closing up the two ends with a silky grating, but so as to allow the water necessary for respiration freely to pass into its habitation. The perfect-winged insect bites through the case, and sets itself free in the water. The common species is the *Phryganea grandis*, but very many other species have been described as occurring throughout Europe. These insects are chiefly nocturnal in habits.

Cade, Jack, a popular agitator of the 15th c., was the leader of an insurrection of the commons of Kent, which broke out in 1450, in the reign of Henry VI. It is sometimes spoken of as an insurrection of the peasantry; but 'yeomen and tradesmen formed the bulk of the insurgents,' who were, moreover, joined 'by more than a hundred esquires and gentlemen,' while at least 'two great landowners of Sussex, the Abbot of Battle and the Prior of Lewes, openly favoured their cause' (Green's *Short Hist. of the Eng. People*, pp. 275-276). C.'s influence over the men of Kent was so great, that, to the number of nearly 20,000, they followed him to Blackheath, demanding, among other things from the King, the dismissal of the Duke of Suffolk and the restoration of the Duke of York to favour, and complaining that the commons were overtaxed, plundered by corrupt court officials, and prevented from freely electing the knights of the shire. In other words, the rebellion was *political*, not *social*, like that headed by Wat Tyler. C. defeated a detachment of troops sent against him, and even ruled London for two days, causing one of the King's favourites, Lord Say, to be beheaded. A promise of pardon caused his followers to disperse. C. then fled; but, in attempting to reach the coast of Sussex, he was followed and killed by an esquire of the name of Iden, and his head stuck upon London Bridge as that of a traitor.

Cadence (from Lat. *cadere*, 'to fall'), in music, a succession of chords used at the close of a phrase or composition. The perfect C., or full close, consists generally of three chords, of which the two last are those of the dominant or dominant seventh (the latter containing the two distinguishing notes of the key—*fa* and *re*), and of the tonic. Its use at the end of a composition is now almost universal, but it seems to have been scarcely known until the time of Monteverde (1566-1650), to whom the credit of bringing it into use greatly belongs. The imperfect C., or half-close, is often employed at the end of less important phrases; in it the tonic chord comes before the dominant, so that the latter leaves upon the ear a sense of unrest and expectation. The 'interrupted' C. is used for certain special effects; in it the preparation for the full close is made, but the tonic chord is replaced by some other, sometimes in an entirely different key.

Cadency, in heraldry, is a term applied to the significance of figures and devices introduced into armorial compositions, in order to distinguish the different members and branches of the same family. The label, the crescent, the mullet, and other marks are, especially in Scottish heraldry, used to distinguish the sons from the father, and from one another during the father's lifetime; and the *bordeur* of various kinds, the chief engrailed, embattled, and the like, are similarly employed to mark the differences between the coats-of-arms of brothers after the death of their father, and also to mark the differences of the houses descended from them. The term C. is also frequently applied to such abatements as *bastard bar* (see *BAR, BASTARD*), which indicate that the arms of a family are diminished or broken.

Cadenza, in music, a more or less ornate phrase, introduced most often near the close of a composition, vocal or instrumental. In some cases composers write their own cadenzas, in others they are left to the performer.

Cader Id'ris (i.e., 'chair of Idris,' a mythical Welsh giant, poet, or prince) is a well-known mountain mass in Merionethshire, about 10 miles long, composed chiefly of basalt and trap rocks. From the loftiest point, *Pen-y-Cader*, 2914 feet high, one can obtain a splendid view westward far over St George's Channel, and eastward to the Wrekin in Salop.

Cadet (Fr. *cadet*, 'a younger brother'; Prov. *capdet*; Low Lat. *capitulum*, a dim. of *caput*, 'the head'; the eldest son being regarded as the first head of the family, the other sons as being

little heads). A *military C.* is a young man studying with a view to service in the army. In this country such students attend the Royal Military Academy, Woolwich (q. v.), or the Royal Military College, Sandhurst (q. v.). At either establishment they receive pay, wear uniform, and are subject to military discipline, although they are, as yet, only working for their commissions as officers. At both, the fee for the son of a civilian is £125 a year, while for the sons of officers there is a sliding scale—a lieutenant paying £40 a year for his son. A commission for the Royal Artillery or Engineers is studied for at Woolwich Academy; high acquirements in mathematics are necessary to pass the entrance examination; the course of instruction comprises surveying, construction, estimating, field-fortification, telegraphy, army-signaling, strategy, military history, and law, and also applied mathematics, metallurgy, chemistry, physics, and practical mechanics. French, German, and Hindustani are also studied. Two years and a half is the shortest period in which a C. can pass through this curriculum. A commission in the line is studied for at Sandhurst College; the entrance examination is not so high, the course of study comprises pretty much the same non-professional subjects as have just been mentioned last, and, in addition to fortification and surveying, it gives prominence to tactics, and military administration and law. The period of attendance is shorter than at Woolwich, and commissions are given to those who stand highest at the final examination.

A *naval C.* is one who is in the preparatory stage for an appointment as midshipman in the Royal Navy. A youth is eligible to a cadetship at from twelve to fourteen years of age. The nominations rest with the First Lord of the Admiralty, except one which a captain may name on commissioning his ship, and two which an admiral may nominate on receiving his flag. The C. has to pass a preliminary examination at the Royal Naval College, Greenwich; he is then, with a view to his being taught rigging and other technical details, sent three months to a training ship, and fifteen months to a sea-going ship, during which time he mess with the midshipmen. At the close of these eighteen months he is eligible to an appointment as midshipman.

Cadet's Fuming Liquor, or **Alkarsin**, a spontaneously inflammable liquor, was discovered by Cadet (1760). It is obtained by distilling a mixture of arsenious acid and acetate of potash, and consists chiefly of Cacodyl (q. v.).

Cadi (Arab 'we learned in law'), is the title of an inferior judge in Mahomedan countries. Like the Mollah, or superior judge, it is taken from the higher ranks of the priesthood.

Cadiz (Iber. *Gadr* or *Gadir*, 'the city'), the capital of a province of the same name, and, next to Barcelona, the most important trading place of Spain, is situated at the N.W. extremity of the peninsula of Leon Isle, on the W. side of the Straits of Gibraltar, and is separated by the canal San Pedro from the mainland, with which, however, it communicates by means of the strongly fortified bridge of Suazo. It is a fortress of the first rank, and by nature and art one of the most powerful strongholds in Europe, being surrounded with walls, and protected by some ten forts, placed at various points on the coast and on islands. To the N.E. of the town lies the beautiful Bay of C., and on the S.E. the deep and sheltered inlet of Puntales, forming a commodious haven frequented by the largest merchant ships and men-of-war. In late years a mole, about 1000 feet long, has been built between the mainland and C., by which the railway can convey freights of sherry and other goods directly to the ship's side. The town itself has undergone extensive improvements since 1786, and has now beautiful wide streets, and is lit with gas, while many of the houses, which are usually flat-roofed, are faced with marble. It is the seat of a bishop, and has a cathedral of the 18th c., five parish churches, seven old monasteries, three nunneries, a public library, an art museum and academy, an astronomical observatory, three hospitals, a house of refuge, an asylum for the insane, a foundling hospital, two theatres, and a circus for bull-fights. It has also many schools, a medico-chirurgical college, nautical and mathematical schools, and school of art, and a church seminary. Outside the walls of the town, the chief buildings are the beautiful Church San Jose, with its double tower, the large steam-mills, and the San Sebastian fort lighthouse. C. is the port of departure of most of the Spanish foreign mails, has many regular

steam lines, and is a station for the fleets of all nations. Its trade has been greatly increased by the recent railway to Seville. In 1872, its exports to Britain and British colonies alone amounted to £2,540,053, and imports to £590,729; while a total of 1140 vessels (387,850 tons) entered the port, and 1146 vessels (399,560 tons) cleared. The exports are mainly sherry and mineral ores, the total value of the former in 1872 being £2,458,487. Pop. (1864), including the forts and suburbs, 71,914. According to ancient tradition, C. was founded by the Phœnicians, under the name *Cadr* or *Gadir*, as early as 1100 B.C., passed over to their descendants and successors, the Carthaginians, and was subsequently (206 B.C.) taken by the Romans, who named it *Gades*; by the Arabs in 711 A.D., and finally by the Spaniards in 1262. The English, under Lord Essex, sacked and partly destroyed C. in 1596, and again stormed it unsuccessfully in 1625 and 1702. It became the seat of the supreme junta during the revolution of 1808, and was besieged by the French from 6th February 1810 to 25th August 1812, when they retired on hearing of Wellington's successes. The French, however, captured it in 1823, and retained it for five years. The revolution of 1868, which overthrew the Government of Isabella, broke out in C. on the 19th September.

Cad'mia, the name applied to the first part of the product of sublimation of roasted zinc ores, which is very rich in metallic cadmium.

Cad'mium is a metal, and was discovered in 1817 by Stromeyer in impure oxide of zinc. It very frequently accompanies zinc in its ores, particularly those found in Silesia. In the extraction of zinc by heating the ores with charcoal, the C., being the more volatile of the two metals, distils over first. In order to separate zinc from C., and obtain the latter in the pure condition, crude C. is dissolved in hydrochloric acid, or a stream of sulphuretted hydrogen passed through the diluted solution; yellow sulphide of C. is precipitated, whilst the zinc remains dissolved. The precipitate is dissolved in strong hydrochloric acid, and to the solution thus obtained carbonate of ammonia is added, when pure carbonate of C. is precipitated, and from this compound the metal is readily extracted by distilling it with charcoal at a white heat. In its physical properties, C. is allied to tin. It is malleable and ductile at ordinary temperatures, but becomes brittle when warmed; when bent it emits a crackling sound. It fuses at a comparatively low temperature (315° C.), and boils at 860° C. Its specific gravity is 8.6. In its chemical relations it resembles zinc. It dissolves readily in dilute acids with evolution of hydrogen; it burns when heated in air, forming brown oxide of C. (CdO). It decomposes water at a high temperature. Unlike zinc, however, C. is precipitated from acid solutions by sulphuretted hydrogen, the precipitate which is formed consisting of sulphide of C. (CdS), a bright yellow substance used as a pigment, and called *Cad'mia*, or *C. Yellow*. Iodide of C. (CdI₂) and Bromide of C. (CdBr₂) are employed in photography. Its chemical symbol is Cd, and its atomic weight 112.

Cad'mus, the mythical founder of Thebes, was the son of Agenor, King of Phœnicia, and grandson of Poseidon. When his sister Europa was carried off by Zeus, C. being sent in search of her, proceeded northward to the coast of Thrace, whence he repaired to Delphi to consult the oracle. He was advised to discontinue his search, to follow a cow which should come in his way, and build a city where it rested. Hence the origin of Thebes, in Boeotia. C. married Harmonia, daughter of Arès and Aphrodité. Domestic calamities drove them from Thebes, and wandering to Illyrium, they died there. Herodotus, and other writers after him, ascribe to C. the introduction of the Phœnician alphabet into Greece. That the Greek symbols were derived from the Phœnician is certain, but when or by whom they were introduced we cannot tell. The solar mythists have no difficulty with C. His name is merely a Græcised form of the Syriac *Kadm*, the east, and therefore he is none other than the sun-god. Everything in the Cadmean myth is *solarised* with equal ease.

Cadoud'al, George, the son of a peasant proprietor, was born at Auray, in Lower Brittany, 1st January 1771. Full of Breton enthusiasm for the Church and King, he joined the insurrection of '93 against the Republic, and fought at Savenay. Imprisoned for a time at Brest, he afterwards devoted his whole

patrimony to the support of De Silz's campaign against Hoche. In spite of the failure of the Quiberon expedition, he continued till 1796 the rapid skirmishing war, full of ambushes and secret signals, which Balzac has described in *Les Chouans*. When the coalition was formed in 1799, C., relying on the promise of the Comte d'Artois to appear in Brittany, raised a second revolt in Morbihan, against which Brune had to be despatched with 10,000 men. The triumph of the new consulate induced C. to make peace, when Napoleon strongly urged him to serve the Republic. C., however, retired to England, where he and his friend Mercier plotted against the First Consul. In 1803 he landed in Normandy, expecting that the people would rise under Pichegru and Moreau. Arrested soon after at Paris, he did not deny his treason, and was executed 25th June 1804. See Crétineau-Joly's *Histoire de la Vendée Militaire*.

Cadu'ceus, the wand borne by heralds and ambassadors in time of war. Originally it was a simple olive branch with *stemmata*, which were afterwards formed into snakes. The C. was also an attribute of Hermes, as the messenger of the gods. The snakes were symbolical of peace, Hermes, according to the myth, having divided with his wand two of these animals which he had found fighting. The C. on works of art is surmounted by two wings, emblematical of diligence and activity.

Cœcil'ia, a genus of *Amphibia* (q. v.), so named from the rudimentary or concealed nature of the eyes. The bodies of these forms (which belong to the amphibian order *Ophiomorpha* or *Gymnophiona*) were formerly included in the Serpent order. They are, however, true amphibians, the young possessing gills, and the adults, as in all amphibia, breathing by lungs. The body is of snake-like form, and may attain a length of several feet. No limbs are developed, and the skin is covered with small scales. The teeth are sharp and recurved, and are borne on the jaws and palate also. The tongue is fleshy, but not protrusible. Numerous ribs exist, but no breastbone is developed. These animals are found in marshy districts of tropical countries, such as Ceylon, Java, and S. America. *Siphonops* or *C. annulatus* is a familiar form. These animals are often confounded with the Blindworms (q. v.) of Britain, which latter, however, are true reptiles.

Cœcum. The C. is the first portion of the great intestine situated in the right iliac fossa, a region corresponding to the right groin. In the human being it is about 2½ inches in length by the same in breadth. It is very large relatively to the size of the intestinal canal in herbivorous animals. For example, in the horse it is a little over 3 feet in length, and is capable of containing 7½ gallons of fluid. In herbivorous animals the C. acts as a reservoir for the large amount of fluid taken by these animals in or along with their food. It is here absorbed by the blood-vessels. The food is not digested in the C., as is often stated, all the molecular changes of digestion having taken place before then. See **INTESTINAL CANAL**.

Cœd'mon, the first of English poets in point of time, was a tenant, or perhaps only a cowherd, on the abbey lands at Whitby. The date of his birth is not known, but he was contemporary with the Abbess Hilda, who ruled between 657 and 680. The pages of Bede contain all that we know of C. We are there told how, on one occasion, when asked to take his turn in the songs of a festive party, he was forced to confess himself unfit, and stole out abashed to the stable. There he fell asleep, when, in his dreams, there came to him one who called him by name, saying, 'Sing, C., some song to me.' 'I cannot sing,' he answered; 'therefore, leaving the feast, I came hither.' 'He who talked with him made answer, 'However that be, yet shall you sing to me.' 'What shall I sing?' asked C. 'The beginning of created things,' was the reply. When C. told his dream to the Abbess Hilda, and showed her his new power of song, he was received into the monastery, and there spent the remainder of his life. He is supposed to have died about the year 680.

The story of C., related by Bede as a miracle, may probably be taken simply to mean that a natural genius, otherwise untutored, was inspired to poetry by the sublime influences of Christianity. His poem called *C.'s Paraphrase* has been preserved in a single 10th c. manuscript, and how much of it may be genuine is a matter of some uncertainty. The most striking feature of the poem, as a whole, is the blending of its sacred subject with the old Skaldic spirit. Its themes are the war in

heaven, the fall of the rebel Satan, the creation, the story of Eden, the Flood, Abraham and Isaac, the passing of the Red Sea, the narrative of Daniel, Belshazzar's feast. That portion which paraphrases New Testament passages is probably by a 'younger' C.—that is, by some other writer imbued with the same spirit and possessing similar powers. It will thus be seen that this earliest of English poets selected from Old Testament history the most vivid and picturesque incidents. These he treats in the same style of rough power, with its uncouth but bold imagery, its profusion of metaphor, its carelessness of art, that is found in the lay of *Beowulf*. The Christian epic differs from the heathen one in subject, and no more. C. has been called the 'Anglo-Saxon Milton.' His choice of theme may perhaps justify the title, if indeed anything could justify the use of the term 'Anglo-Saxon' in such a case; but the comparison suggested is preposterous. Though far from being on a level with the rhyming chroniclers, he is immeasurably inferior to the later Englishman in wealth and grandeur of thought. Still there are some points of resemblance between the *Paraphrase* and the *Paradise Lost*, chiefly seen in the conception of Satan. These have given rise to the notion that Milton may have read C.'s work—a supposition which is, at least, unlikely. But C. does certainly at times triumph over a language by no means plastic, and a metre the reverse of musical, rising then into epic dignity. C.'s poem was first printed by Junius, at Amsterdam, 1655; more recently by Thorpe (Lond. 1832). Summaries of it are given in Turner's *Hist. of Anglo-Saxons*, iii. c. 3; in Morley's *English Writers*, vol. I.; and Conybeare's *Illustrations of Anglo-Saxon Poetry*. It has been edited by Grein (*Bibliothek der Angel-Sächsischen Poesie*, Göttingen, 3 vols. 1857-63) and Bouterwek (*Cadmon*, with glossary, 2 vols. Elberfeld, 1849-54). See also Watson's *Cadmon, the First English Poet* (Lond. 1875).

Caclatu'ra. See CHASING.

Caen, one of the most picturesque towns of France, capital of the department of Calvados, lies in a beautiful valley at the confluence of the Odon with the Orne, 122 miles W.N.W. of Paris, and 27 miles S.W. of Havre. It is only 8 miles from the mouth of the Orne, communicates also with the sea at Ouistreham by means of a canal, and has a fine basin 1870 feet long, 164 broad, and 16 deep, capable of receiving 80 large vessels. C. abounds in beautiful churches, of which the finest are the *Abbaye-aux-Hommes*, founded by William the Conqueror in 1066; the Church of *La Trinité*, founded by Matilda, wife of the Conqueror; the Church of St Nicolas, now converted into military offices; that of St Pierre, with a magnificent spire of the 14th c.; and *Notre-Dame* (1684), in the Italian style. There are also a university, a court of justice, an exchange, a public library of 50,000 vols., an academy of fine arts, a society for the study of Norman antiquities, with a rich museum, many high-class schools, and a theatre. The Orne is here crossed by a granite bridge. C. has manufactures of lace, hosiery, linen, pottery, cutlery, wall-paper, &c.; and there are breweries, dye-works, and shipbuilding. There is a good export trade in corn, wine, fruits, C. Stone (q. v.), &c. The imports are chiefly wood, coal, steel, spices, and coffee. In 1874 there entered the port 662 vessels of 85,739 tons, and cleared 709 of 89,779 tons. Pop. (1872) 32,999. Its ancient name was *Cathem* (though we find in Latin documents *Cadomus*), of which C. is probably a corruption. The town dates from the 11th c.

Caen Stone, a fine-grained white limestone of the Great or Bath Oolite deposits, found in Brittany and in central France. It is a stone of beautiful texture, easily worked into most elaborate carved forms, and therefore highly valued for internal decoration. Since the Norman invasion it has been much used in this country, chiefly for cathedrals and other ecclesiastical buildings. It was used in the building of Canterbury Cathedral and Westminster Abbey, and the new façade of Buckingham Palace is of C. S.

Cænaph'thium, a term applied to the peculiar inflorescence of *Dorstenia*, *Ambora*, and the common fig, in which the receptacle expands, and encloses the flowers within a hollow, almost completely, as in the fig, and partially so, as in *Dorstenia*.

Caerle'on ('city or camp of the legion'), a small market-town in Monmouthshire, on the Usk, 3 miles N.E. of Newport, a station on the South Wales Railway. It has some iron and tinplate works. Pop. (1871) 1306. There is perhaps

no place in England whose fame so entirely belongs to a far-distant past. The *Ica Silurum* of the Romans, it was in the earliest times the capital of Britannia Secunda, and the residence for years of the second Augustan Legion (hence its name). Its relics of baths, amphitheatre, temples; its tessellated pavements and Samian ware; its objects in bronze and iron, glass, enamel, bone, and ivory, preserved in its museum or by private individuals, attest its ancient importance. But its renown, if not its real interest, is legendary rather than historical. When Geoffrey of Monmouth (see ARTHURIAN ROMANCE) withdrew Arthur from his proper principality of Strathclyde to the region of South Wales, he fixed his 'magnificent court' at C. (*Hist. Brit.*, b. ix. c. xii.), and henceforth it shone with peerless lustre in the realm of romance. C. was the seat of an archbishop till the 6th c., and was noted as a school of learning; but it lost its importance after the English conquest, and gradually dwindled down to its present insignificance.

Caermarthen, or **Caermarthen** (the *Maridunum* of the Romans), a flourishing town of Wales, capital of Caermarthenshire, 80 miles N.W. of Cardiff by railway. It lies on the Towy, 9 miles from its mouth, and is accessible to vessels of 200 tons. C., which was an ancient residence of the Welsh princes, has a fine old castle, extensive docks, a town-hall, and a Presbyterian Welsh college. The Towy is here crossed by a stone bridge. There is an active export trade in lead, bark, corn, coal, butter, and slates. *Caer Fyrdwyn* is the oldest Welsh name of the town. Under the native princes it was the capital of S. Wales till the 9th c., and in later times was the scene of frequent conflicts between the Welsh and the Norman intruders. Along with Llanelly, C. returns one member to Parliament. Pop. (1871) 10,488. C. is the birthplace of General Sir Thomas Picton.

Caermarthenshire, the largest county of Wales, lies mainly in the basin of the Towy, and has an area of 974 sq. miles, and a pop. (1871) of 115,710. It has a hilly surface, intersected by fertile and densely wooded valleys, and produces a large quantity of oats and barley. Besides the Towy, the chief rivers are the Cothy, Taff, and Teify, in all of which there is splendid salmon and trout fishing. The uplands afford excellent pasture, and much attention is given to the rearing of short cattle. In 1873 there were 75,150 acres under corn, 10,752 under green crops, and 326,354 in pasture. Of live stock, C. supported in the same year 17,281 horses, 105,194 cattle, 223,869 sheep, and 26,720 pigs. The geological formation in the N. is Silurian and in the S. Devonian and carboniferous, while the chief minerals are iron, lead, coal, and lime. There are manufactures of tinned iron plates, leather, and flannel, and an export trade chiefly in coal, grain, and cattle. The chief towns are Caermarthen, Llandeils, and Llanelly. C. has many British and Roman remains, and several fine old churches and ruined castles.

C. Bay, an inlet of Bristol Channel, has a marshy coast, is 17 miles wide, and extends along a part of the coasts of Glamorgan and Pembroke. It contains the small island of Caldy, with a lighthouse rising to a height of 210 feet above the sea.

Caernarvon, or **Carnarvon** (*Caer-yn-ar-Fon*, 'city opposite Mona,' the old name of Anglesea), the capital of Caernarvonshire, a municipal and parliamentary borough, seaport, and market-town, on the E. side of the Menai Strait, 235 miles N.W. of London. The town stands on a peninsula, and is defended by strong walls and circular towers. Although it has few or no manufactures, its prosperity as a seaport is greatly on the increase. In 1873, 2566 vessels of 176,386 tons entered, and 2467 of 171,104 tons cleared the port of C. In 1874, the value of the imports of foreign and colonial merchandise was £28,253; the gross amount of customs revenue received, £7499; and the value of the exports, £208,402. The principal exports are copper ore and slates. There is an extensive iron and brass foundry, and shipbuilding is carried on to some extent. C. is a favourite watering-place and resort of tourists. C. itself is not a very old place, but close by is the site of the Roman station Segontium, the *Caer Senglant* of the Britons, also called *Caer Custeint* ('camp of Constantine'), which was for some centuries the capital of the princes of N. Wales. C. proper may be said to date from the reign of Edward I., who built here, between 1283 and 1294, a castle whose ruins are unsurpassed in magnificence. Edward made C. a free borough, the first in Wales. In the long border struggle between the Welsh and English it frequently

suffered, and during the civil war of the 17th c. the castle was repeatedly taken both by Royalists and Parliamentarians. C., in conjunction with Pwllheli, Nevin, Criccieth, Conway, and Bangor, returns one member to Parliament. Pop. (1871) 9449.

Caernarvonshire, or **Carnarvonshire**, a maritime county of N. Wales, bounded N. by the Irish Sea, E. by Denbighshire, S. by Merionethshire and Cardigan Bay, W. by Caernarvon Bay and Menai Strait. It is 51 miles long; greatest breadth, 22 miles; area, 369,482 statute acres, or 577 sq. miles; pop. (1871) 106,121. The Snowdon range traverses the county from N.E. to S.W., attaining in Snowdon an elevation of 3571 feet, the greatest in S. Britain. From this four ridges diverge, and in the hollows (*Cwm*s or *Coombes*) between are numerous tarns or lakes of small size, generally the expansions of mountain streams. The largest river is the Conway, which is navigable for 10 miles for vessels of about 100 tons. In 1873 there were 24,217 acres under corn, 8955 under green crops, and 147,934 in pasture. In the same year C. supported 7069 horses, 51,259 cattle, 225,239 sheep, and 19,030 pigs. The mineral treasures consist of copper ore, lead, zinc, coal, and slates, which are quarried and exported in vast quantities; the only manufacture, and that but to a limited extent, is flannel. Caernarvon, Bangor, and Conway are the principal towns; but since the beauties of this part of Wales have been opened up to the public, other places have sprung into some importance, as Llanberis, Llandudno, and Tremadoc. C. returns one member to Parliament. The county contains numerous remains of British fortresses, and several cromlechs and stone circles. It was the scene of the last great struggle of the Welsh under Llewellyn for independence, and amid the fastnesses of Snowdon that gallant prince resisted Edward to the last.

Casalpin'ea, a genus of trees of the natural order *Leguminosæ* (q. v.), sub-order *Casalpinia*, containing about 50 species. The sub-order comprises about 700 species, including *Senna* (q. v.), *Tamarinds* (q. v.), *Carob* (q. v.), the *W. India Locust-Tree* (q. v.), *Copaiva* (q. v.), *Aloes Wood* (q. v.), *Logwood* (q. v.), *Brazil Wood* (q. v.), *Camwood* (q. v.), *Purple-Heart* (q. v.), and the *Wallaba* (q. v.). The genus *C.* comprises various species noted for their properties—e.g., *C. coriaria*, the twisted legumes of which are astringent, and much used in tanning under the name of *Divi-divi* or *Libidibi*, as are those of *C. Papai* for the same purpose, under the name of *Pi-pi*.

In India the powdered legumes have also been used as an astringent and anti-periodic. *C. Sappan* furnishes the Sappan, Bookum or Wukkuum Wood (q. v.), while *C. echinata* is the Nicaragua Wood (q. v.). There is no British species of the order *C.*

Cæs'ar, the name of an ancient family of the Julia gens, which claimed as its founder Iulus, son of Æneas. The first known to have borne it is Sextus Julius C., prætor B.C. 208. The origin of the term is uncertain. After the family rose to supreme power, the name C. was used by the emperors prefixed to their own, immediately after the title *Imperator*. Though the family line became extinct with Nero, the name was retained till the death of Domitian. Hadrian allowed Ælius Verus to assume it; thereafter it became the title of the heir-apparent, while that of Augustus was given to the Emperor.

CÆSAR C. JULIUS, son of the prætor of the same name, and Aurelia, daughter of Cotta, was born 12th July 100 B.C. At the age of thirteen, through the instrumentality of Marius, the husband of his aunt Julia, he obtained the dignity of high priest of Jupiter; at fifteen he lost his father, and two years after divorced his wife, Cossutia, in order that he might marry Cornelia, daughter of Lucius Cinna, leader of the Marian faction. This union exasperated Sulla, who, on C.'s refusing to repudiate Cornelia, proscribed him and deprived him of his priestly office and fortune. To save his life C. hid himself among the Sabines, with whom he remained till Sulla, moved by the Vestal Virgins and others, pardoned him, at the same time predicting that that boy would ruin the Roman aristocracy. C. set out for Asia 81 B.C., and under M. Minucius Thermus took part in the sacking of Mitylene, for personal bravery in which he was awarded a civic crown. He next went to Cilicia, but the news of Sulla's death (78 B.C.) caused him to hasten back to Rome, in case there might be some chance of his rising to power. Lepidus had anticipated him; the state was in arms,

but C., with that sagacity which always distinguished him, kept aloof for the time. His policy, however, was clearly indicated by his impeachment of Cn. Dolabella for extortion (77 B.C.), and of C. Antonius (76 B.C.) for the same crime. Though in neither case did he obtain a conviction, the forensic ability which he displayed added to his popularity. Encouraged by the applause which he received, and fully aware of his latent oratorical powers, he sailed for Rhodes to study eloquence under Apollonius Molo; but on the voyage he was seized by pirates, who kept him a prisoner till fifty talents were paid for his ransom. On his release C. pursued his captors, secured, and crucified them. He returned to Rome in 74 B.C., to assume the office of pontifex, to which he had been elected. C.'s star was now in the ascendant, and he endeavoured by his affable demeanour and liberality to secure the good opinion of the people. The first public office to which he was elected was the military tribuneship; but we hear little of him till 70 B.C., when he was brought into close connection with Pompey, then in the zenith of his glory. In 68 B.C. he obtained the office of quæstor, and, after the death of his wife Cornelia, went in that capacity to Further Spain, from which he returned in the following year. He then married Pompeia, daughter of Q. Pompeius Rufus, thereby cementing his union with Pompey. Elected to the curule ædileship 66 B.C., he continued to support Pompey, and increased his own popularity during his term of office by his liberality and munificence. Flushed with his success, and eager to revive the glories of the Marian party, he caused the marbles of Marius, which Sulla had destroyed, to be restored, and placed in the Capitol by night. C. continued favourable to the popular cause, and in 63 B.C., on the death of Metellus, was elected to the office of Pontifex maximus, and shortly after to that of prætor. At this time Catiline's conspiracy was discovered, in which C. is believed by some to have taken part; but neither the persuasions nor bribes of Piso and Catullus could induce Cicero to include him in the number of the conspirators. In 62 B.C. he entered on his office of prætor, and became in 61 B.C. pro-prætor in Further Spain, where his career was a series of brilliant successes. On his return he was elected consul with M. Calpurnius Bibulus (59 B.C.), and succeeded in reconciling Pompey and Crassus, and forming with them the First Triumvirate. With their co-operation C. carried his agrarian law. He now strengthened his union with Pompey by giving him his daughter Julia in marriage. At this time he married Calpurnia, daughter of L. Piso, and, on the expiry of his consulship, obtained for himself the province of Cisalpine Gaul and Illyricum—still further increased by the addition of Transalpine Gaul—for a period of five years. C. was now placed in circumstances favourable to the gratification of his ambition and to the development of his military genius. In 58 B.C. he set out for his province, and with an army of veterans entered on the subjugation of Transalpine Gaul. His first campaign was against the Helvetii, whom he defeated with terrible slaughter near Bibracte (Autun). Not a third of that brave people survived the campaign. His next war was with Ariovistus, a German king, against whom he took the field on the representations of Divitiacus, an Æduan chief, and whose forces he totally routed near Vesontio (Besançon). In the following year (57 B.C.) the Belgic war began. The Remi submitted on his approach; the Suessiones, Bellovaci, and Ambiani succumbed in turn; and lastly the Nervii, after a terrible resistance, were completely overthrown, only 500 fighting men being left of an army of 60,000. After this victory, C. led his army into winter quarters in Central Gaul. Next year he entered on his third campaign; but a difference having arisen between his co-triumvirs, he was detained for some months at Luca (Lucca). A reconciliation having been effected, he proceeded to Brittany, where the Veneti had risen in insurrection. By his tact and vigorous action they were soon overcome, and thus, in three years, Transalpine Gaul was reduced to subjection.

In 55 B.C., Pompey went to Spain and Crassus to Syria, Gaul being continued to C. for five years more—i.e., to 49 B.C. After reducing some German tribes, C. invaded Britain, and soon returned. Next year he made a second invasion, but beyond penetrating a considerable way into the country he achieved little. On his return to Gaul, some of the tribes in the N.E. revolted, but were soon quelled. C. wintered at Samarobriæ (Amiens). In 53 B.C. another Gallic insurrection occupied C., who was now gradually drawing towards Italy. The spirit of anarchy and disaffection there seemed to favour his projects,

when a fierce insurrection arose, headed by a young nobleman, Vercingetorix. C., though it was mid-winter, appeared among the rebellious Arverni with amazing rapidity. Vercingetorix, after a determined resistance, numerous successes, and wonderful displays of generalship, was forced to shut himself up in Alesia (Alise in Burgundy) with 70,000 men. C., now placed between two great hostile armies, first routed the combined Gauls without, amounting to over a quarter of a million, and then compelled Vercingetorix to surrender. During the following year C. reduced the few refractory tribes that remained; conciliated the conquered by his kindness, and won over the people by acts of generosity and magnanimity. The death of Crassus in 53 B.C. had left C. no rival save Pompey, who by this time had assumed the leadership of the aristocratic party. Dreading the increasing fame of C., the senate decreed that he should disarm his forces. Antony and Cassius vetoed the decree, were ejected from the senate-house, and fled to C.'s camp. The insult offered to the tribunes was a sufficient pretext for war. C. crossed the Rubicon, hastened southwards, and pursued his rival as far as Brundisium. Thence Pompey sailed for Greece, which he reached 17th March 49 B.C., leaving C. master of Italy. C. now marched to Rome, and thence proceeded to Spain, where he subdued the partisans of Pompey. On his way home he took Massilia, where intelligence reached him that he had been made dictator. After eleven days he resigned the office. He then hastened to Brundisium, and in the beginning of 48 B.C. crossed to Greece. At Dyrrhachium he sustained a repulse from Pompey, now reinforced by aid from Greece, Egypt, and the East, and retreated to Thessaly. In a second battle, fought at Pharsalia on the 9th of August, he overthrew Pompey, who fled to Egypt, where he was murdered. On C.'s arrival in Egypt he became enamoured of Cleopatra, and was involved in the Alexandrine war, which he brought to a successful issue in March B.C. 47. He then directed his steps homewards through Syria and Asia Minor; defeated Pharnaces, son of the great Mithridates, on 2d August, at Zela in Pontus; reached Rome in September; crossed to Africa; routed Pompey's generals, Scipio and Cato, at Thapsus, 6th April 46 B.C., and was in Rome again in July, when he was appointed dictator for ten years. C. now showed great magnanimity, declaring that he would treat Pompeians and Cæsarians alike as friends. Having never yet enjoyed the honours of a triumph, he now celebrated four, commemorating his victories in Gaul, Egypt, Pontus, and Africa; during which he entertained the people with princely liberality. In this year (46 B.C.) he reformed the calendar, thereby conferring an inestimable boon on mankind. In 45 B.C. he went to Spain, and on 17th March defeated Cneius and Sextus, sons of Pompey, on the hard-fought field of Munda. After a brief detention in Spain, he entered Rome in triumph; and, among other honours, received the titles of *Pater patriæ*, *Imperator*, *Dictator*, and *Profectus morum* for life. Statues of him were placed in the temples; he was raised to the rank of a god; the month Julius was named in his honour; his image was struck on the coins; his person was declared sacred, and all the senate swore to watch over his safety. C. now turned his attention to reforms and projects for ensuring the stability of the empire; and having now acquired kingly power, he was desirous also of wearing the diadem. The proposal, however, was received with disfavour, and C. for a time gave up the idea. Meanwhile, in the midst of all his glory, power, and lofty hopes, a conspiracy was formed, with Cassius as ringleader, and C. was assassinated in the senate-house on the Ides (15th) of March 44 B.C. For a time he tried to shield himself from the daggers of his assailants; but when he saw Brutus among the number, he muffled himself with his toga and resigned himself to his fate. Thus perished one of the greatest of men at the age of fifty-six. Originally ambitious, C. latterly had at heart only the good of his country; nor, amid all his successes, did he ever forget the kingly virtue of clemency. He had extended the Roman power over the then known world, bequeathing to his successors an empire powerful, peaceful, and purified. C. was tall of stature, noble in bearing, sharp-featured, pale-faced, with dark, sparkling eyes. He was ambitious, brave, generous, liberal, and learned, but licentious and profligate. His intellectual powers were of the highest order. As an orator, he was surpassed by Cicero alone. As a historian, he is remarkable for purity, simplicity, and vigour of style. As a military genius, he occupies the foremost rank, and his statesmanship was

equal to his generalship. C. was a voluminous writer; but nothing has come down to us except his *Commentaries*, written during his campaigns. The *editio princeps* was printed at Rome in 1449.

Cæsare's was the name of several towns in different parts of the Roman Empire, and was given in honour of the Roman emperor. The most notable are—1. The capital of Cappadocia, originally called Mazaka or Eusebia, situated on the river Argæus, in a swampy plain of no great fertility. When Cappadocia was made a Roman province by Tiberius (18 A.D.), Mazaka received the name of C. Under the Empire it became one of the chief mints of Asia Minor, and remained, down to the later Byzantine period, a political and military centre of Asia Minor. The ruins of C., destroyed by an earthquake, lie not far from the modern *Kaisariyeh* (q. v.), whose name is merely an Arabic corruption of the Latin. 2. The maritime city on the coast of Palestine, on the great road from Tyre to Egypt, called, in Strabo's time, *Turris Strabonis*. It was enlarged, if not originally built, by King Herod, 13 B.C., and named in honour of Augustus. Herod surrounded the city with a wall, adorned it with several palaces of white marble, built a temple, and laid out a harbour equal in size to the Piræus. C. thus became one of the first cities in Judea, the seat of the Roman governor, and the capital of the province. Vespasian was here called to assume the purple, and his son, Titus, made C. a Roman colony and conferred on it many privileges. It is still called *Kaisariyeh*, but is nothing more than a few ruined houses, while its once splendid harbour is completely silted up. 3. The place mentioned in Matt. xvi. 13 and Mark viii. 27 was built at the easternmost source of the Jordan, at the southern base of Mount Hermon. It is the *Panium* of Josephus. Its double name, *Cæsarea Philippi*, was given to it by Philip of Trachonitis, partly in honour of the emperor, and partly after himself, as having enlarged and embellished it. The modern name is *Banîds*, now a village of some forty wretched houses.

Cæsarean Operation, one of the most dangerous operations in surgery (so called because Cæsar was said to have been born in this way), consisting in removal of a child from the mother by section of the abdominal wall and of the uterus. It is an operation sometimes necessary when, in consequence of contraction, obstruction, or malformation, a living child cannot be expelled by the maternal passages; but the danger to the mother is so great that it is rarely performed. In cases where a living child at full time cannot possibly be born, the necessity for Cæsarean section is obviated by the induction of premature labour at an early stage of pregnancy.

Cæ'sium is a rare metal, closely allied to potassium, and is remarkable as having been the first element discovered by the aid of the spectroscopic. (See SPECTRUM ANALYSIS.) The name C. was given to it by its discoverers, Bunsen and Kirchhoff, because of the two blue lines characteristic of its spectrum (*Cæsius*, Lat. 'blue'). C. is contained in many mineral waters, and was first obtained from those of Dürkheim, in which it is accompanied by the metals potassium, sodium, lithium, and rubidium. It is present in largest quantity in a mineral found in the island of Elba, called *Pollux*, which contains 25 per cent. of C.

Caffa. See KAFFA.

Caff'eine, or **The'ine**, is an alkaloid contained in tea, coffee, guarana, and Paraguay tea, and was discovered by Runge in 1820. Coffee contains from '8-1 per cent.; tea from 2-4 per cent. The simplest mode of preparing C. consists in heating well-dried tea in a flask provided with a long neck to a temperature of about 200° C. The alkaloid gradually sublimes and condenses in long, colourless needles in the neck of the flask. C. is only sparingly soluble in alcohol, ether, and water; it has a slightly bitter taste, and is very poisonous; its composition is expressed by the formula $C_8H_{10}N_4O_2$. C. has also been prepared synthetically from another alkaloid, called *Theobromine*, which occurs in cocoa.

Caff're Bread, a name given to several species of *Encephalartos* (natural order *Cycadaceæ*), which have much starch in their stems, and hence afford food to the Caffres of S. Africa, where they are sometimes known as bread-trees.

Caffres and Caff'ria. See KAFFIRS and KAFFRARIA.

Caf'ta, Kât, or Khat, the slender young shoots, with the attached leaves, of *Catha edulis*, a plant belonging to the natural order *Celastraceæ*, which are chewed by the Arabs to produce exhilaration of spirits and wakefulness. It is also used as a decoction. The leaves and shoots of *C. spinosa* are also applied in the same way.

Oagayan, Sulu, an island group in the Sulu Archipelago, N.E. of Borneo. C. is also the name of a river 300 miles long, of a lake, and of a province, in the N. of Luzon, one of the Philippine Islands, with an area of nearly 10,000 sq. miles, and a pop. (1871) of 114,396.

Oagliari, a town of Italy, capital of the island of Sardinia, on the S. coast of the island, at the mouth of the Mulargia. The harbour is large, safe, and fortified. C. is the seat of a university and of an archbishop, has several fine churches and palaces, an interesting museum of antiquities, the remains of an ancient aqueduct, and many other memorials of the Roman period. It has several dockyards, is the emporium for nearly the entire trade of the island, has manufactures of firearms and gunpowder, and exports wine, olives, and salt. Steamers ply between C. and Genoa, and a telegraphic cable connects it with the continent. Pop. (1872) 32,834. C. was a Phœnician colony, and its Phœnician name (Latinised *Caralis* or *Cararis*) has suffered little change.

Cagliostro, Alessandro, Comte de, or Giuseppe Balsamo, born of poor parents at Palermo, June 2, 1743, after a short period of service in the convent of Cartegirone, and an idle, thievish life at home, went to Rome, where he married Lorenza Feliciani, the daughter of a girdle-maker, and tried to support himself by drawing and painting. C. was already an adept in forgery, and in predicting fortunes and showing visions by means of phosphorus and legerdemain. He and his wife now determined to take up imposture as a profession. They visited Venice, Marseille, Madrid, Lisbon, Brussels, &c., C. sometimes appearing as a Prussian colonel, a Marquis Pellegrini, and finally as Count C.; his wife, who took the name of Seraphina, enticing men of wealth by her beauty. Having picked up a little chemistry at the convent laboratory, C. was able to profess a quack alchemy; he sold a 'beautifying water,' and 'wine of Egypt,' for renovating the complexion. In 1772 he was in England as a house-painter; in 1776 he did business as a quack in Whitcombe Street, London, but was thrown into prison. He next took up freemasonry, writing a book in which he promised his adherents, by means of the 'prime matter' and the 'acacia,' a perfect physical and moral regeneration. C. himself assumed the title of Grand Cophta, and arranged a number of absurd rites. Successful in Saxony, he was exposed at St Petersburg by the imperial physician Mouncey, and in Warsaw by a Count M——, who published the book, *C. Démasqué à Varsovie en 1780*. In 1783, C. appeared at Strasbourg, where he cultivated the intimacy of Cardinal Louis de Rohan, with whom he afterwards suffered imprisonment and trial (31st May 1786) for complicity in the affair of the Diamond Necklace. He then started the quack business again in Sloane Street, Knightsbridge, where, among other dupes, he met Lord George Gordon. Driven from England, and from Turin and Trent, for his character was now becoming notorious, he in 1789 reached Rome, where he was seized and thrown into prison by the Inquisition. In 1791, his manuscript of Egyptian masonry was ordered to be burned, and C. himself was sentenced to perpetual imprisonment in the fortress of St Leo, where he lingered till 1795. In 1787 Goethe visited C.'s family at Palermo. See Carlyle, *Miscellaneous Essays*, vol. v.

Cagno'la Luigi, Marchese, an Italian architect of noble family, born at Milan, 9th June 1762. He was sent by his father to study jurisprudence at Rome in 1776; but, inspired by the noble monuments with which he there found himself surrounded, he decided to devote himself to the study and profession of architecture. Genius and rank combined to make him famous. Napoleon created him member of the *Conseil des Anciens* and Chevalier of the Iron Crown. C. died 14th August 1833. His principal works are the *Arch of the Simphon* and the *Arch of Peace* (Milan), commissioned by Napoleon in 1802 and 1804, and the former of which is believed to be the most beautiful arch of modern times.

Oag'ot, or Argot (which has been derived from the Celtic *cakod*, 'dirty,' the Gothic *gass*, *canes Gothi*, 'Gothic dogs,' and

cassot, 'leprous'), is properly applied to an extinct race of deformed dwarfs among the peasants of the Pyrenees, closely allied to the Cacus and Caqueux of Brittany, the Colibets and Cahets of Saintonge, the Marans of Auvergne, and the Caffos of the Alps. Their natural defects of mind and body were aggravated by the law of the Estates of Navarre and Bordeaux (1672) prohibiting C. to marry any but C., and requiring them to wear on the shoulder a mark in red cloth of a goose's or duck's foot. They were shunned and set apart by their fellow-Christians: each village had its 'Fontaine des C.,' where alone they might drink; each church a door 4 feet in height, by which they must enter, and a separate *benitier*, where they must sprinkle themselves; each cemetery its distinct place of interment. The priest handed them the wafer at the end of a stick. A suspicion of Gothic-Arian heresy attached to them. Only the most repulsive labour was assigned to them by the town authorities, but they were allowed to be carpenters and rope-makers. At the Revolution of 1789, the C. managed to destroy nearly all documents and monuments preserving the history of their families. Now, therefore, only here and there, as in the valleys of Ossau, Aure, and Lavedan, does the suspicion of C. descent rest upon a family, and show itself, not in the denial of rights, but in silent aversion. The name, however, lingers in such proverbs as that applied to a very stupid person: 'Il est pire que le C. de Gamachie.' The 'Leper's Bath' at Aix is an interesting relic of this 'accursed race.' There are among the Pyrenean Cagots many *crétins* (imbeciles with stunted limbs, huge heads, dull eyes, lolling tongues), and persons with *gottres* (bladder-like lumps of glandular flesh, covered with knots of blue veins, depending from the lower jaw and front neck), but the home of *crétinisme* is Aosta (in the Porte de Suveye, or Porta Decumana, of which city is the Tour du Lépreux, celebrated in Xavier de Maistre's beautiful story), and the canton Valais, especially Martigny. In the Val d'Aosta, from Villeneuve to Châtillon, from one-fourth to one-half of the population is affected. There are all degrees of imbecility, from complete vacancy, to the *crétin* who can count and tend cattle. Many, however, are deaf and dumb, and many have the *gottre* (Latin, *guttur*), which, however, is met with also in perfectly intelligent and healthy men and women. *Crétinisme* may be hereditary in a latent form, but it is common to find healthy children of *crétins*; nor is the disease entirely derived from hygienic conditions, for it is found occasionally in the higher classes. Its cause has been suggested by McClelland to lie in the calcareous geological formations, on which, and not on the granites and metamorphic series, it has been observed to prevail. The better view seems to connect it with the atmospheric conditions which have been found to influence epidemics. These are assisted by filthy habits and dwellings, and by the illegal marriages which still take place among *crétins*. The inveteracy of the constitutional tendency is shown by the failure of Dr Guggenbühl to cure *crétins* removed at an early age to his establishment, the Abendberg, at Interlaken. The Spanish Cagots of Navarre are said to be tall, strong, well-built in person, and of regular features. The word C. is used in French in distinction to *bigot*, to denote an aggressive religious hypocrite. The name also occurs in the forms *Capot*, *Gabet*, *Cassati*, *Chrestian*, *Gavacho* (from *Gabali*, mountaineer). *Gaso* is an old word for a leper. *Crétin* is not derived from *Christianus* (in the sense of innocent), but from *craie* (Lat. *creta*), which refers to the sallow complexion of the class. The chief medical and statistical authorities on Crétinism are St Lager, *Études sur Crétinisme* (Par. 1867); Morel, *Traité des Dégénérescences* (Par. 1851); Niépce, *Traité du Gottre* (1851). Among German writers on the subject may be mentioned Iphofen (1817), and Kösch and Maffei (1844).

Cahete, or Quiete, a town of Brazil, in the province of Minas Geraes, and standing on the right bank of a river of the same name, a tributary of the Rio Doce. It is about 280 miles N. by E. of Rio de Janeiro. Agriculture and mining are the chief industries. Pop. about 6000.

Oahir' (Irish Gael. *Cathair*, 'the stone fort'), a town of Ireland, county of Tipperary, lies picturesquely on the Suir, 43 miles N.W. of Waterford by rail, has large flour-mills. It was formerly the residence of the Earls of Glengall, and on an island in the river there is a castle of the 12th c., the original 'stone fort' from which the town takes its name. Near C. are extensive barracks. Pop. (1871) 2694.

Oahors, a town in the department of Lot, France, on the

right bank of the river of the same name, 60 miles N. of Toulouse. It has a cathedral, built at the close of the 10th c., and adorned with two cupolas, an interesting specimen of the Romano-Byzantine architecture; an obelisk to Fénelon, erected in 1820; and some remains of a Roman amphitheatre and of a magnificent aqueduct. The principal manufactures are pottery, cotton yarns, woollen stuffs, and leather; and there is a trade in wine (produced in the neighbourhood), brandy, oil, and cattle. Pop. (1872) 11,416. C. is a very ancient town. It was first called *Divona*, then, from the people who possessed it, *Cadurci*, of which C. is only a corruption. Under the Romans it became a municipal city, and was the point of intersection of four Roman roads. Visigoths, Vandals, Franks, Saracens, Normans sacked it in turn, and in the Albigensian wars of the middle ages it was a stronghold of Catholicism.

Cai'cos and Turks Islands, a small group in the W. Indies, about 150 miles N. of Hayti, with a total area of 420 sq. miles, and a pop. (1871) of 4723. They belong to Britain, and have a local president, subordinate since 1873 to the Governor of Jamaica. Chief of the group are Great, N., and E. Caicos, Salt Clay and Grand Turk. They have exports of sugar, cotton, and salt, amounting yearly to about £25,000; while the imports are valued at £30,000. The C. yield a revenue of £8000. Of the inhabitants, 572 are white, 758 coloured, and 3393 black; while 3315 belong to the Methodist and Baptist Churches.—The name C. or Keys is applied to various other small clusters of isles or rocks, as the Keys of Eleuthera, of Providence, of Florida, &c.

Cai'fa, or Haifa (anc. *Hefa*), a small seaport on the coast of Palestine, lies at the N. base of Mount Carmel, on the S. shore of the Bay of Acre, 13 miles across the bay from Acre. It has a good harbour, but no large buildings. The exports are chiefly wheat, sesame seed, and barley. In 1873 there entered the port 584 vessels of 72,886 tons, 52 being steamers. Pop. 2000, comprising Moslems, Jews, and a few Europeans.

Caillie or Caillé, René, an enterprising French traveller in Africa, was born at Mauze (Deux-Sèvres), September 19, 1799. The reading of *Robinson Crusoe* kindled in him while a boy a passion for foreign adventure. At the age of sixteen he set off with sixty francs to find his way to Senegal. Residing there as a trader in 1826, he heard of the prize of 10,000 francs offered by the Geographical Society of Paris to the first traveller who should visit Timbuctu. Leaving Sierra Leone in March 1827, he reached that city in May the following year. He next crossed the Sahara to the Tangier coast, and arrived at Fez in August. He received the prize, and subsequently an annuity of 1000 francs, and also the decoration of the Legion of Honour. His notes of travel, to which M. Jomard, a member of the French Institute, added geographical remarks, were published under the title, *Journal d'un Voyage à Tombouctou et Fenné, dans l'Afrique Centrale, &c.* C. died near Paris, 17th May 1838.

Cain (according to Gen. iv. 'the obtained') was the first-born of Adam and Eve. His brief history is familiar, and need not be given here. According to some modern critics, the narrative can scarcely have reached us in a strictly historical form, since we are told that he was afraid of being killed, when there was no one to kill him but his own family, and that he built a city when he had only one son. It has therefore been conjectured that in the story of C. and Abel, with their posterity, we see symbolised the facts that the pristine pastoral life was one of simplicity and purity, and that progress in civilisation is accompanied with violence and godlessness. The notion that the story of the offerings is intended by a (late) priestly writer to give a divine sanction to the Levitical law, that an Israelite should never bring an offering of the fruits of the ground except when he had not an animal, lies outside the region of secure criticism.

Cainozo'ic or Kainozoic Period, in geology, the name applied to the newest or most recent epoch, which includes rocks the fossils of which consist of species mostly identical with existing animals and plants. This epoch includes the so-called *Tertiary* rocks, which may be divided, beginning with the oldest of the series, as follows:—1. *Eocene*, lower, middle, and upper. 2. *Miocene*, lower and upper. 3. *Pliocene*, older (white and red crags) and newer (Norwich crag). 4. *Pleistocene, Post-Tertiary, or Quaternary*, post-pliocene, including glacial, pre- and post-glacial deposits, and recent (existing soils).

Ca Ira, 'That will go on,' the refrain of a well-known song of the Jacobins during the first French revolution. It gave a title to the song, which, as the *Carillon National*, 'the national chime,' was, like the *Marseillaise*, the *Carmagnole*, the *Chant du Départ*, adopted as a national lyric.

Caird, Rev. John, D.D., Principal of Glasgow University, was born at Greenock in 1820. He studied at Glasgow University; was ordained to the parish of Newton-on-Ayr in 1845, and transferred to Lady Yester's Church, Edinburgh, in 1847. After remaining there two years, C. accepted, in 1850, the charge of Errol, in Perthshire—this step being taken owing to impaired health. *The Religion of Common Life*, a sermon preached by him before the Queen in the parish church of Crathie in 1855, was published the same year by royal command. He became minister of Park Church, Glasgow, in 1857; published a volume of sermons in 1858, and received from his own university the degree of D.D. in 1860. In 1862 he became Professor of Divinity in it, and eleven years later was appointed Principal. C.'s latest publication is *The Universal Religion*, a lecture delivered in Westminster Abbey on November 30, 1874. C. is the most eloquent and thoughtful rhetorician in the Scotch Church, and has a fame not confined to his denomination or his country.

Cairn is a Celtic word signifying heap, and appears constantly in the names of mountains in Celtic districts. It is also applied to the heap of loose stones which marks the summit of a hill, and which is the simplest form of the monumental C., whether raised as a boundary, a tombstone, a rendezvous, or to commemorate a battle, or other striking event. The more important cairns, however, are raised over stone chambers and galleries. In the famous C. at New Grange on the Boyne, a low tunnel leads to a central chamber 20 feet high, other chambers branching off at the sides. At Stennis, in Orkney, there is a remarkable stone-burrow, called Maeshowe, a conical mound of stones covered with earth, and surrounded at the base by a ditch. A gallery leads to a chamber, built to the height of 6 feet with long hewn slabs of stone of miscellaneous length, the upper portion of the walls (of which 7 feet still remain) being constructed of long unbroken slabs which shorten with each course, and thus form a sort of 'rectangular dome.' The arch must have been unknown to the builders. A very similar C. in wood has been found at Jellinge, Denmark, and is supposed to be the tomb of Queen Thyra. The runes on the stones of Maeshowe were found to be of comparatively modern date; but the sculpture on the granite blocks of New Grange, which have been likened to those found in the Breton district of Morbihan, in the forts of Rowton Lynn in Northumberland, and at the Laws near Dundee, is probably more ancient. The purpose of these burrows is not known: once erected, they would naturally be selected for burial, inscriptions, and perhaps deposits of valuable articles.

The smaller cairns, so common in the pastoral districts of the centre and N. of Scotland, were undoubtedly constructed for burial: they frequently contain human remains in stone kists, or boxes made of stone slabs. They also contain inverted urns, mostly circular in shape, and of the capacity of a gallon, which also sometimes lie in kists, or are simply protected by the surrounding stones. Flint and stone implements occur along with the urns, which are sometimes so numerous in one C. as to suggest that a family has been interred, or that the place marks a skirmish. Besides the kists or stone axes, various articles in bronze, hatchets, spearheads, shields, and cooking-pots, have been found, and a few personal decorations in gold, bone, serpentine, amber, &c. It is out of these materials that the celebrated hypothesis of the stone, bronze, and iron ages has been manufactured.

Cairngorm (Gael. 'the Blue Peak'), a mountain in the S.W. of Aberdeenshire (q. v.), 4090 feet high. It gives name to a brownish-yellow variety of quartz or rock crystal. This crystal is a distinguishing feature in Scotch jewellery and lapidary-work, and is much prized for setting in plaid brooches, the tops of dirks, snuff-mulls, &c., besides being used like other precious stones for bracelets, ear-rings, studs, seals, &c.

Cai'ro (Arab. *Masr-al-Kähira*, 'capital of victory'), the capital of Egypt, lies on the right bank of the Nile, 5 miles above the Nile Delta, in a sandy waste, which stretches to the Mokat

tam mountain range. It is the most important centre of learning and commerce in the E., and has now extensive railway and telegraphic communication. The town, which is divided into quarters, separating the various creeds and nationalities, has undergone vast improvement in late years. It is lighted with gas, and has an excellent water supply, while many fine broad streets (1875) have been opened through the crowded parts, which were formerly so fruitful of epidemics. The Ezbekiyah, a filthy refuse place, which long disgraced a fashionable part of C., was (1873) converted into an ornamental garden, with an artificial lake, and enclosed with iron railings. Several beautiful carriage roads have been constructed, notably to the pyramids, to Heliopolis, and to the suburb of Bulak (q. v.). All these new roads and streets are bordered by acacias and sycamores. Another great public work is the erection of a magnificent iron bridge over the Nile, completed in 1874. The chief buildings are the citadel, the viceroy's palace, the mosque of Sultan Achmed-Ibn-Tulun, which was built in 879 A.D., and is older than the town itself, and that of Sultan Hassan, finished in 1362. These mosques are of vast size, and have minarets of immense height, built of alternate lines of red and white stone. The former is specially notable for an extensive arcade of pointed arches, supposed to be the earliest extant specimen of this form of architecture. C. has also an Italian opera-house, a French theatre, and a large circus, for which in the winter season the performers are brought from France, England, and Italy. In educational matters, C. has been greatly advanced under the present viceroy. In 1872 the Government colleges of the town had 141 professors and 1025 students, and the national schools had 255 teachers and 11,495 pupils, of whom 6774 belonged to the theological university attached to the Mosque-al-Azhar. The small body of the Copts in C. erected a church in 1867, and the German and English colonies have also recently opened Protestant churches. The trade of C. is rapidly increasing. The exports consist of native produce, of which the chief items are ivory, gum, wood, hides and ostrich feathers, and from Upper Egypt cotton and sugar; while the imports are mainly indigo and shawls from India and Persia, sheep and tobacco from Turkey and Syria, cotton and woollen goods, prints and hardware from Great Britain and Germany, and cloth, furniture, and millinery from France and Austria. In 1872 the value of the exports to Britain alone was £16,455,731, and of British imports £7,213,063. In 1873 some 120,000 lbs. of ivory were exported, chiefly to Britain, while 50,000 lbs. of wax were received by Kartoum from Abyssinia. The traffic in slaves still continues, but is now carried on much more secretly. C. has railway communication with Alexandria, and on the left bank of the Nile with Embaba, to be continued as far as Tell-el-Barud, while a line has been projected in a southerly direction as far as Kartoum. The railway to Suez across the desert has been abandoned since the completion of the Suez Canal Company's fresh-water canal, and passengers are now conveyed from Alexandria to Suez by a new line *via* Zagazig and Ismailia. A great variety of languages are spoken in C., but Arabic predominates. Pop. (1872) 349,883, of whom the majority are Arabs, there being also many Turks, who form the ruling class, Jews, Armenians, Africans, Europeans, and a few Copts, descended from the ancient Egyptians. C. was founded by the Fatimite Califs in 969 A.D., and its fortress was built by Saladin in 1176. It was taken from the Mamluke princes by the Turkish Sultan Selim in 1517. It was taken by the French in 1798, and in 1801 by the British, who restored it to the Porte. The terrible massacre of the Mamlukes took place in C., March 1, 1811. The tombs of the Mamluke rulers of Egypt, about a mile from the city, are singularly beautiful, being built of white marble, richly carved and coloured, and supporting gilded domes.

Caisson, in civil engineering, is a large case of timber or iron capable of floating by itself, and in or on which the piers of a bridge are built. In the former case, the C. merely serves to keep the water away from the workmen, and may be removed when the masonry is finished; in the latter, it forms itself the substructure, sinking by the weight of masonry above it (or by the excavations of divers or workmen underneath it) as the work progresses. In military matters, a C. is a name sometimes given to an ammunition wagon. In connection with shipping, a C. is a large floating air chamber, used for raising sunken vessels.

Caithness, a county in the extreme N.E. of Scotland, with an area of 455,708 statute acres, or 712 sq. miles, and a pop.

(1871) of 39,992. It forms a bold peninsula (hence the Norse *ness*, or 'nose') between the Moray and Pentland Firths, and from N. to S. is about 40 miles long, with a breadth from E. to W. of about 30 miles. The general character of the surface is flat, much of it being heath-covered moor. The formation is Devonian throughout, with the exception of patches of granite on the W. border, and in many parts is highly fossiliferous. Agriculture rather than grazing prevails, though of late years sheep-farming has been extending. In 1873 there were under crops or in grass 101,220 acres. The chief grain crop is oats; green-cropping, especially in turnips, is successful, and the cultivation of artificial grasses has been introduced. Black cattle and sheep are reared in large numbers for the markets of the S. In 1873 there were 22,037 cattle, 167,491 sheep, and 4928 horses. There are no lakes of any size, and no navigable rivers. Weaving is carried on to a limited extent, but, properly speaking, there are no manufactures. The chief industry is fishing, in which about 10,500 persons are engaged, the value of the boats and nets being estimated at £132,000. Over 200,000 barrels of salted herrings are exported yearly; other exports are salmon, oats, and *C. flagstones* (q. v.). Wick is the county town; Thurso is the only other town, but on the E. coast there are many fishing-villages. A railway traversing C., and connecting Wick and Thurso with the S., was in operation in 1875. C. returns one member to Parliament. C. was long in the possession of the Norsemen, and many of the localities have Norse names; while many of the inhabitants, especially on the E. and N. coasts, are of Scandinavian descent, and use a dialect of Lowland Scotch which has a considerable infusion of Norse words.

Caithness flagstone, a very hard, compact, close-grained stone, occurring in beds from one to nine or ten inches thick in the old red sandstone of Caithness. It is in very great request for the foot-pavements of towns, and more than 10,000 tons are annually quarried in Caithness for that purpose.

Caius (a Latinised form of *Kaye* or *Key*), **Dr John**, was born at Norwich, 6th October 1510, and educated at Gonville Hall, Cambridge. He studied medicine for two or three years in Italy, and after his return practised at Cambridge, Shrewsbury, and Norwich. He was appointed by Henry VIII. Lecturer on Anatomy to the Company of Surgeons, London; became President of the College of Physicians, and also physician to Edward VI., Mary, and Elizabeth. In 1557 he elevated Gonville Hall into C. College, of which he became master, and continued so till his death at London, 29th July 1573. C. wrote on a great variety of subjects—antiquarian, scientific, and critical. A complete list of his works is given in Cooper's *Athene Cantabrigienses*.

Caius College (properly *Gonville and Caius College*), Cambridge. Gonville Hall, the original institution, on which C. C. was subsequently grafted, was founded by Edmund Gonville in 1348; enriched and removed to the present site of the college in 1353 by William Bateman, Bishop of Norwich, and refounded and erected into a college under royal charter, with the title of *Gonville and C. C.*, by Dr John Caius (q. v.) in 1558. It is known locally as 'Key's College,' from the circumstance that Kaye or Key was the baptismal name of its founder. New statutes were given under the provision of an Act of Parliament (19 and 20 Vict., c. 88), by which the college consists of a master, thirty fellows, and thirty-six scholars. The number of fellowships is now increased to thirty-two by the creation of a new fellowship in 1865 and of another in 1870. The fellowships are not vacated by marriage. The actual number of scholarships on the foundation is forty, and in addition to these, two more have quire recently been founded by the late Dr Shuttleworth of Berne (for proficiency in botany and comparative anatomy), which are of the value of £60 each, and are tenable for three years. There are also the five Tancred studentships in medicine, of the value of £100 annually, and which may be held from three to eight years. The number of undergraduates in attendance (1875) was 139.

Cajanus (from *Cajang*, the Malayan name of one of the species), a genus of plants of the natural order *Leguminosae*, section *Papilionaceae*. *C. indicus*, a native of the E. Indies, is now cultivated in the W. Indies, tropical America, and Africa, and on some of the Pacific islands. In Jamaica it is called the Congo

pea. *In India the pulse or seed is called *dhal* or *dhol*, or *urhur*, and forms a large portion of the food of all classes. In the W. Indies the pulse is called pigeon-pea, and is used as a substitute for English peas, also for feeding pigeons and other fowls. The variety known as No-eye pea is most esteemed. The Congo pea is harder and coarser. Horses and cattle are very fond of the young branches and leaves, either in a fresh or a dried state. It is one of the most generally useful of tropical plants. See *Treasury of Botany*.

Calj'oput, Caljuputi (*Melaleuca Cajuputi*, or *M. minor*), a tree of the natural order *Myrtaceæ*, sub-order *Leptospermeæ*, from the leaves of which the oil of C. is obtained by distillation. It is a native of the mountainous portion of the Molucca Islands, and much of the oil is prepared in the island of Banda. The oil is pungent, volatile, aromatic, green, transparent, and limpid, and with so pungent, penetrating an odour that it is only agreeable when diffused. Two sackfuls of the leaves will scarcely yield three drachms of the oil. At one time it was much employed in cholera, though apparently without success. It is still used internally as a stimulant, as an antispasmodic, and as a diaphoretic; externally, when mixed with olive-oil or dissolved in rectified spirits, as a stimulant embrocation in rheumatism, neuralgia, &c. It has the property of dissolving caoutchouc. In Australia the leaves of *M. scoparia* and *M. genistifolia* are used as substitutes for tea.

Cake-Breaker. Within the last quarter of a century, the increasing demand for animal food has rendered it imperative that the natural supplies of hay and roots should be supplemented by artificial feeding stuffs, in order that cattle and sheep should be ripened at an earlier age, and brought up to heavier weights. Oil-cake, cotton-cake, and a variety of other condimental substances are employed in fattening. It has been found that much cake is wasted when given in a whole state, and a machine was invented for the purpose of breaking it into pieces of from 1½ to 2 inches square. The machine consists of a box set upon iron legs; within the box revolve in opposite directions two iron-teethed rollers, which speedily disintegrate the cake to the required size. The machine is not costly, and the economy very great. There are many good machines in the market; but perhaps those of Messrs Samuelson of Banbury and Picksley Sims of Manchester are the best.

Calabar', part of the coast-land of N. Guinea, Africa, extends from the river Benin to the Cameroon Mountains, and receives its name from the two rivers the Old and New C., the former of which rises in the Qua Mountains, and flows W. then S. into the Bight of Biafra, its estuary being 9 miles broad at the mouth. This river is navigable to steamers for 200 miles, and on its banks are situated the principal towns of the Qua Land, Duke Town, Creek Town, Omun, and Acuno-cuno. The produce of Qua consists of yams, sugar-cane, palm-oil. The New C. forms one of the mouths of the Niger, and carries on, like the Bonny, though to a smaller extent, a trade in palm-oil and slaves. The natives are polygamists and cannibals, and have not been much affected by the missions which have been long established there by the United Presbyterian Church.

Calabar Bean (*Physostigma venenosum*, natural order *Leguminosæ*). This remarkable plant was first accurately described by Professor Balfour, and the name *Physostigma* was by him given to the plant on account of its peculiar hooded stigma, and *venenosum* in reference to its poisonous properties. C. B. is a native of Old Calabar, Western Africa. It is a large, twining, shrubby plant. Its stem is often about 40 or 50 feet long, and varies from 1 to 2 inches in thickness. It has alternate leaves, and large, beautiful, purple flowers. Its pod is about 7 inches in length, and contains two or three seeds. The seeds are used in medicine, and are possessed of very poisonous properties. They are about the size of a large horse-bean, reddish-brown externally, white internally. They weigh about one drachm each, are kidney-shaped, with two flat sides, and a longitudinal furrow running along its convex margin, ending in an aperture near one extremity of the seed. They taste like ordinary beans, are without bitterness or aromatic flavour. The poisonous properties of this substance have long been known to the natives of Old Calabar, and by them C. B. has been extensively used for criminal purposes. When a person is suspected of having committed a

crime, he is made to swallow some of the C. B., and if he survives the *ordeal* he is pronounced innocent; but if he dies, it is held to prove his guilt. When the administrator of the poison wishes the suspected person to survive, he generally administers the poison mixed with some powerful emetic, so that the vomiting which ensues may save the person's life. It is called by the natives 'Esere,' and by the European missionaries '*ordeal bean* of Old Calabar.' Some of these beans were brought to Scotland by these missionaries, and the physiological effects of C. B. have been carefully investigated by Sir Robert Christison, Dr T. R. Fraser, and others. C. B. acts specially on the spinal chord, rendering the patient insensible to pain, and perfectly unable to walk or move. It, however, is without effect on the sensory nerves or the brain, so that the person under the influence of C. B. is perfectly conscious to the last. C. B. produces death in two ways, either by paralysis of the muscles of respiration, *Asphyxia* (q. v.), or by paralysis of the ganglia of the heart, *Syncope* (q. v.). Its most remarkable effect is its power of contracting the pupil when a solution is dropped into the eye. In this respect it is antagonistic to Belladonna (q. v.). This property of contracting the pupil is useful in certain diseases of the eye, when we wish to diminish the amount of light admitted into that organ. C. B. has been given internally for tetanus or lockjaw, and other nervous affections, in doses of one to four grains. In cases of poisoning with C. B., give Emetics (q. v.) and stimulants.

Calabash Nutmeg, the seeds of *Monodora Myristica*, a plant of the natural order *Anonaceæ* (q. v.), the Custard-apple order, having aromatic properties similar to the true nutmeg. They are commonly known as Jamaica or American nutmegs.

Calabash Tree (*Crescentia Cujete*), a tree of the natural order *Bignoniaceæ* (q. v.), sub-order *Crescentiaceæ*, a native of the W. Indies, and the tropical parts of S. America. The wood is tough and flexible, and adapted for coachbuilding; but it is the *calabash*, or hard shell of the fruit, which is most used. Cups and vessels of all sorts, often beautifully polished and carved, are made from them; they will even withstand the action of fire, and can therefore be used as kettles.

Cal'aba Tree. See CALOPHYLLUM.

Calabo'sa, or Calabo'zo, a town in the state of Caracas, Venezuela, on the left bank of the river Guarico, a tributary of the Apure, and 185 miles S. W. of Caracas. It was formerly an Indian village, and is now the residence of many wealthy proprietors of cattle-farms (*hatos*) in the surrounding llanos. Pop. 4000. Since 1813 C. has been the scene of several battles; Bolivar and Paez here defeated the Spaniards under Morales, February 3, 1820, and again under La Torre, June 24, 1821.

Calab'ria, the S. W. peninsula of the kingdom of Italy, comprises the provinces of Cosenza, Catanzaro, and Reggio, and has a length of some 160 miles, with a breadth varying from 18 to 70. Area, 1500 sq. miles; pop. (1871) 1,206,302. C. is traversed by the southerly ridge of the Apennines, which sends down several wild torrents, but no rivers of magnitude. The valleys and plains are singularly fertile, and there is abundance of excellent pasture. C. supports large numbers of sheep, horned cattle, and fine horses. The chief products are oil, wine, grain, rice, hemp, cotton, flax, saffron, manna, honey, silk, and southern fruits. The sides of the Apennines are clad with dense forests of oak, beech, larch, pine, plantane, and aloes. Along the coasts there are fisheries of tunny, coral, and anchovy. C. is also rich in iron, copper, gypsum, antimony, alabaster, and marble. The climate is delightful, but during the hot season there is malaria in some parts; earthquakes occasionally happen. Among the chief towns are Reggio, Rossano, and Monteleone. A railway round the S. and E. coast, from Reggio to Taranto, is now for the most part in operation. In ancient times the S. E. promontory of Italy was called C., from being inhabited by the Calabri, a tribe first mentioned by Polybius under that name, but supposed to be identical with the Messapians, and to be of Hellenic origin. The modern C. has long been infested by banditti, and almost the only outstanding fact in the history of the country is the fierce massacre (1560) of a Waldensian colony, settled here in 1340. The Calabrians are sprightly and high-spirited, but vindictive.

Calad'ium. See COCCO.

Calaguala, the rhizome of *Acrostichum Huacaro*, or 'little cord,' which is used in Peru as a sudorific, diuretic febrifuge, and anti-venereal. The rhizome of *Polypodium C.*, the slender or genuine C., and those of *P. crassifolium*, the thick C. or deer's-tongue, are also reported to have the same properties.

Calahorra (a Span. corruption of the Arab. *Kalat-harral*, 'the stone-castle'), a town in the province of Logroño, Spain, on the Cidacos, a tributary of the Ebro. It is on the site of the ancient *Calagurris*, and has an old cathedral with a façade of brick. Quintilian was born here, and, according to some, Aulus Prudentius, the first Christian poet. The surrounding district is fertile, producing in abundance corn and fruits.

Calais (Celt. *cala*, 'a port or harbour'), a seaport and fortress of the first class, in the department of Pas-de-Calais, France, 30 miles N.E. of Boulogne, and 120 N.N.W. of Paris, with which places it is connected by railway. It is the great port of debarkation for English travellers entering France, and is becoming a manufacturing place of importance. The most noteworthy edifices are the Cathedral, which contains Vandyck's painting of the 'Assumption,' the *Hôtel de Ville*, built in 1740, and the *Hôtel Dussin*, which comprises a hotel, a theatre, a garden, and public baths. The citadel, which is on the W. side, commands the town and harbour, and the flat ground on the S. and E. can be laid under water at pleasure. The principal manufactures are bobbin-net and hosiery, and there are oil and soap works, tanneries, salt-refineries, distilleries, and shipbuilding yards. The harbour, formed by two moles, with continuations of wooden piers seawards, is nearly dry at ebb tide, and at high water has a depth of from 15 to 18 feet. It admits vessels of 600 tons, and has a floating dock and three lighthouses. The exports are chiefly horses, wine, linens, cottons, silks, and salted provisions. Their total value in 1873 was £3,836,000; the total value of the imports in the same year was £4,632,000. Pop. (1872) 11,554. C.'s history cannot be traced beyond the middle ages. Up to the 13th c. it was called *Scalas*. About that time it was fortified. Edward III. of England took C. in 1347, after a siege of eleven months, and his sparing the lives of the six heroic citizens, at the instance of Queen Philippa, is one of the best-known and most touching incidents in history. C. remained in the possession of England till its capture in 1558 by the Duc de Guise, since when its history has been purely French.

Calaman'der Wood, a cabinet wood resembling rosewood, but more durable and beautiful than it. It is produced by the *Diospyros quasita*, a species of the ebony genus (see *DIOSPYROS*), a native of S.E. India and of Ceylon. It is now getting scarce. It is very dense, and takes a beautiful polish. The name is most probably a corruption of Coromandel wood.

Calamary, or **Squid** (*Loligo*). A common and familiar example of this genus of 'two-gilled' or *Dibranchiate* cuttlefishes (see *CEPHALOPODA*) is the *Loligo vulgaris* or common squid, an organism frequently cast up in numbers on the British coasts. These forms belong to the family *Teuthida*, in which there are ten arms, two being larger than the others, while the fourth left arm in the males becomes a *Hectocotylus* (q. v.) to subserve reproduction. The shell exists as an internal horny *pen* or *gladius*, and several of these may be developed in one individual. Terminal fins exist, and the suckers of the arms are *pedunculated*, or provided with short stalks. The C. squid is largely used for bait; and several other species of C. are known, such as *L. media*, *L. marmorata*, &c.

Calamian'nes, the name of an island and of a group of islands in the Philippines, S.E. of Luzon. The island, from which the group takes its name, is 35 miles long and 15 broad, is fertile, mountainous, and abounding in animal life. There is also a province called C. in the adjacent island of Palawan, which has a pop. (1871) of 27,189.

Calamine. There are two distinct minerals which bear this name. The one is a hydrated silicate of zinc, having the composition represented by the formula $ZnOH_2OSiO_3$, and is often called *prismatic* or *electric C.* The other is carbonate of zinc ($ZnCO_3$), and is also called *Smithsonite*.

Calamint, the French name, now naturalised in the English language, for *Calamintha officinalis*, a plant of the natural order *Labiata*. *C. officinalis*, *C. Nepeta*, and *C. sylvatica* are

aromatic plants to which extraordinary virtues were once ascribed. They are sometimes used as materials for tea. *C. Acinos*, or basil thyme, is a low, shrubby plant, the leaves of which are fragrant and aromatic. *C. Clinopodium*, the wild basil, is also aromatic.

Calamites, a genus of fossil plants found in various formations, from the Devonian to the Oolite, but attaining its maximum in the carboniferous, in which more than forty species have been discovered. They have been very commonly described as allied to *Equisetaceae* (q. v.), an opinion in which Carruthers and Schimper still coincide, but Hooker long ago showed that this view was erroneous—some of the most characteristic points of the structure of the horse-tails, such as the siliceous stomata, circle of teeth of the leaves at the joints, are wanting in the C. This botanist considered that they were allied to the ferns or to the club-mosses. On the other hand, Brongniart classed some of them among the Gymnospermous Dicotyledons, and others among the Equisetaceae, in which view he is followed by Dawson and others. Professor Williamson, of Manchester, the latest investigator of these plants, considers that he has clearly made out that they are exogenous in structure. 'The plant possessed three distinct concentric layers of tissues, a central pith, surrounded by a ligneous zone, which in its turn was invested by a thick cortical or epidermal cellular structure.' The Calamitean literature is extensive, but perhaps the fullest account may be found in Williamson's *Organisation of the Fossil Plants of the Coal Measures*, Part I., Calamites, *Philosophical Transactions*, 1872.

Cal'amus, the reed-pen used by the ancients in writing. The best kinds of reed for this purpose were got from Egypt and Cnidus. They were cut and split with a knife as quills are with us, and when blunt they were also sharpened with a knife. This process was by the Romans called 'tempering.'

Calamus, a genus of palms. See RATTAN, DRAGON'S BLOOD, and CANE.

Calamus Aromaticus, a name given by the ancients to a plant which is probably *Andropogon calamus aromaticus*, which yields the grass-oil of India. (See LEMON GRASS.) The name *Calamus* is also sometimes applied to the sweet flag (*Acorus calamus*), and it is believed that the sweet calamus and cane of the Bible (Exod. xxx. 23, and Jer. vi. 20) are identical with the C. of the Greeks and Romans.

Cal'amy, Edmund, an English divine and Presbyterian apologist, was born in London in 1600, studied at Cambridge, and, after being for a time domestic chaplain to the Bishop of Ely, threw himself into the controversy between Presbyterians and Episcopalians, adopting the side of the former, and having, it is believed, a considerable share in the authorship of the celebrated polemic pamphlet *Smectymnus* (q. v.). C., however, was opposed to republicanism and the execution of Charles I., and would have obtained a bishopric after the Restoration had he been willing to accept it. He, however, took the post of royal chaplain, but soon resigned it for conscientious reasons. He died October 29, 1666. His eldest son, Edmund, was ejected from his living of Moreton for nonconformity, and died in 1685. His second son, Benjamin, became an eminent High Church divine and pamphleteer, and died in 1686, prebendary of St Paul's. Edmund had a son, also named Edmund, born in 1671, and commonly known as the Younger, who distinguished himself as a nonconformist theologian and controversialist. Among his works is a series of biographies of ministers and others ejected after the Restoration by, or before, the Act of Uniformity. In 1709 he visited Scotland, and had the degree of D.D. conferred upon him by the Universities of Edinburgh, Glasgow, and Aberdeen. He died June 3, 1732.

Calan'do, in music, an expression mark denoting a gradual decrease in loudness, accompanied by some slackening of the time.

Calan'dra. See CORN WEEVIL.

Calandrin'ia, a genus of plants belonging to the Purslane order (*Portulacaceae*), several of which are cultivated—e.g., *C. umbellata* from Chili, *C. speciosa* from California, &c.

Calandro'ne, a simple reed instrument used by Italian peasants.

Oal's, Jean, a victim of religious fanaticism, who has a permanent place in history, belonged to a Huguenot family in Languedoc, and was born in 1698. He married an Englishwoman, and followed the trade of a merchant in Toulouse. One night in the month of October 1761, his eldest son, Marc Antoine (a Catholic), was found dead (by hanging) at the shop door. The excited religious feeling of the town compelled the trial of the whole family, and secured the condemnation of C. to the wheel, which he underwent 9th March 1762. His widow fled into Switzerland, where she told her story to Voltaire. By his exertions the iniquitous sentence of the local 'Parlement' was reversed on appeal (1766), and a large sum in compensation paid to the family. The process was a striking illustration, not only of religious intolerance, but of the defects of French criminal procedure. It forms the text of the sequel to Voltaire's essay *Sur la Tolérance*. A large collection of interesting documents connected with the case will be found in the 36th volume of his collected works. There is little doubt that young C. committed suicide. Toulouse was soon after disgraced by the *Affaire Sirven*.

Oalassa'ya Bark. See CINCHONA.

Oalatāfīmī, a town in the province of Trapani, Sicily, 28 miles S.W. of Palermo, has a remarkable mosaic altar in the church of Sta. Croce. The place, which derives its name from the Arabs (*Kalat-al-Fīmī*), was taken by them in 828, and long remained in their possession. It was the scene of a victory gained by Garibaldi over the Neapolitans, May 15, 1860. Pop. 8780.

Oalatagiro'ne, or **Oaltagirone**, a growing town of Sicily, province of Catania, lies in the Val di Noto, 22 miles N.N.W. of Ragusa; has active manufactures, chiefly of cottons and earthenware. Pop. (1872) 25,978.

Oalatascibett'a, or **Oalascibett'a**, a town of Sicily, in the province of Caltanissetta, about 46 miles W. of Catania, and near the line of railway from that city to the interior. It was founded in 1080, has an old church, and commands a fine view. Pop. about 5000. The name is of Arabic origin, and means the *castle of Saïd* or *Xibth*.

Oalatayud', a city of Aragon, Spain, on the Jalon, 48 miles S.W. of Saragossa. It is of Moorish origin, and was built out of the remains of ancient *Bilbilis* by Ayub (Job), the nephew of Musa, hence the name—C. signifying in Arabic the *castle of Ayub*. The castle gives the town, otherwise dilapidated, an imposing look. C. has woollen, linen, and hempen manufactures. Pop. about 11,000. The environs are fertile, and irrigation produces excellent pasture.

Oalathid'ium, **Oal'athus**, **Oalathid'ia**, a head of flowers, such as that of the dandelion and other *Compositæ* (q. v.). It is the same as a *Capitulum*.

Oalatra'va, **Knights of**, a Spanish order instituted at Calatrava in 1158, whose original costume consisted of a coat of white mail, with a white scapulary, a black hat, and a pilgrim's hood. At present their costume is a white mantle, with a red cross cut out in the form of lilies on the left breast, while the cross of the order has the same symbol on a silver ground. Their statutes were framed by the Chapter-General of the Cistercian monks, sanctioned in 1164 by the Bishop of Toledo, and afterwards by the Pope. They acquired great influence by the privileges conferred on them, by the lands which they wrested from the Moors in Spain and Portugal, and by the fact that their grand-masters were always chosen from the highest families in Spain. The K. of C. suffered a severe defeat in 1197 from the Emir Jakub-ben-Yussef, when nearly the whole order was destroyed, and Calatrava was taken by the Moors. The remnant removed to Salvatierra. The victory of Las Navas de Tolosa, however, in 1212, once more brightened the fortunes of the Christian cause. At last, falling under the jealousy of the crown, two of the knights were executed for treason; and, on the death of the thirteenth grand-master in 1489, the administration of the order was transferred to the king by a bull of Pope Innocent VIII., and in 1523 the grand-mastership was formally united to the Spanish crown. Since 1808 the order, whose great wealth has long vanished, has been simply an order of merit.

Calatrava la Vieja, a ruined city of Spain, province of Ciudad Real, on the S. bank of the Guadiana, 12 miles N.E. of Ciudad Real, was in the middle ages a strongly fortified town. It was called *La Vieja* ('the old') to distinguish it from the convent of the Knights of C., built in 1214, and called *C. la Nueva* ('the new').

Calcareous substances contain lime or salts of calcium as their principal constituent. C. waters contain chalk or carbonate of calcium (CaCO_3), dissolved by excess of carbonic acid (CO_2). Such waters are hard, but they lose their hardness when boiled (temporary hardness), owing to the loss of carbonic acid and the precipitation of chalk.

Calcareous Spar, or **Oalo Spar** (Lat. *calc.*, 'lime'), native carbonate of lime, crystallised in a great diversity of forms, derived from an obtuse rhombohedron. When pure it is colourless, but frequently it assumes a grey, yellow, green, red, or brown colour, from the admixture of iron, magnesia, chrome, and other impurities. It has usually a vitreous, sometimes an earthy, lustre; in density it ranges from 2.5 to 2.72, and in hardness from 2.5 to 3.5 Mohs. *Iceland spar*, so called from the finest specimens being obtained from the E. coast of Iceland, is one of the purest varieties of C. S., and crystals of it exhibit the optical phenomenon of the double refraction of light in a remarkable manner. C. S. is most extensively and widely distributed, being one of the most abundant minerals. The mines of Derbyshire, Devonshire, and Cornwall, in England, and that of Andreasberg, in the Harz, yield most beautiful crystals.

Calcareous Tufa, or **Oalo Tuff**, a soft porous variety of carbonate of lime deposited from solution in water. It is found in tubular, botryoidal, and other amorphous masses, sometimes incrusting organic remains, and varying in colour from grey to brown, with a predominating tinge of yellow. Considerable deposits occur near Brunswick, at Blakenwell in Dorsetshire, and in the Roman aqueducts from the heights of the Eiffel to Cologne and Trier. *Travertine*, a harder and less friable variety, occurring on the banks of the Tiber, is used at Rome as a building material.

Calceola'ria, a genus of plants belonging to the natural order *Scrophulariaceæ*, distinguished by the beauty of their flowers, the corollas of which are roughly slipper-shaped, hence the name (*calceolaris*, Lat. 'a shoemaker,' or *calceolus*, 'a little shoe'). They are natives of S. America, and are found only on the western slope of the Andes, or on the southern extremity of the mainland and adjacent islands, either near the sea or at a great height on the mountains. *C. floribunda*, for example, is found in the vicinity of Quito at an elevation of 11,000 feet above the sea-level. Others are found near the sea-shore in the Falkland Islands, *C. Polakowskii*, of Port Famine, is among the prettiest of its genus. Many are cultivated in our gardens; and by crossing them a variety of forms have been obtained, so that the original pure species are getting rather uncommon. In S. America the roots of *C. arachnoidea*, the original of many of our garden hybrids, are employed (under the name of *Relbun*) for dyeing woollen cloth of a crimson colour. All the species are easily propagated by cuttings, and require frequent watering.

Calcina'tion is the process of heating to a high temperature, or roasting, by which substances are made to yield up volatile constituents, or are oxidised. The word is evidently derived from the process of lime-burning.

Oal'cium is a metal whose compounds are widely distributed and abundant. Chalk, limestone, arragonite, marble, and Iceland spar are carbonate of C., anhydrite and gypsum its sulphate, fluor-spar its fluoride, and bone-ash and apatite its phosphate. The metal was first isolated by Sir Humphrey Davy in 1808, who obtained it, amalgamated with mercury, by the action of the electric current on a mixture of moistened slaked lime and oxide of mercury. On heating the amalgam obtained in this manner, metallic C. remained, whilst the mercury passed off in the state of vapour. The metal is produced more readily, and in larger quantities, by the action of the electric current on a mixture of the chlorides of C., strontium, and ammonium. C. is a pale yellow metal, malleable, ductile, and very light (sp. gr. 1.578). It decomposes water at ordinary temperatures, liberating hydrogen, and combining with oxygen and water to form slaked lime. It readily oxidises in the air, and if heated burns with a very in-

tense light. The atomic weight of C. is 40, and the symbol for its atom Ca. C., together with barium, strontium, and magnesium, forms a group called metals of the alkaline earths. See LIME.

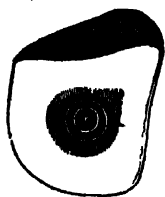
Calcott, Sir Augustus Wall, B.A., born at Kensington, 1779, was for some time a chorister in Westminster Abbey, commenced painting at an early age, first exhibited at the Royal Academy in 1799, and was soon recognised as one of the best painters of English coast and rural scenery. He was admitted R.A. in 1810, travelled in Italy in 1827, and afterwards chiefly affected Italian subjects; exhibited his 'Raffaello and the Fornarina' in 1837, and in the same year was appointed surveyor of H.M. pictures, and knighted. C. died 25th November 1844.

Calcott, John Wall, a distinguished English musician, born in 1766. He obtained the degree of Bachelor of Music at Oxford at the age of nineteen, and a few years afterwards that of Doctor. In 1805 he published a musical grammar; but his mind shortly afterwards gave way through overwork, and, with a short interval, he continued insane until his death in 1821. Some of his glees, as *In the Lonely Vale of Streams*, *O Snatch me Swift*, *To all you Ladies*, &c., are still well known.

Calculating Machines are daily becoming more and more necessary to the professional calculator, especially in connection with nautical and mathematical tables and the reduction of astronomical observations. The first instrument of this kind was invented by Pascal, and after his we have the inventions of L'Epine, Leibnitz, Polenus of Padua, Hahn of Würtemberg, and Müller of Hesse-Darmstadt. M. Thomas' *Arithmometre* is very generally known, and is exceedingly useful in the calculation of results dependent upon the operations of multiplication and division. MM. G. and E. Scheutz of Stockholm have constructed a large machine for the evolution of any series the law of the formation of whose terms can be intrusted to it. Most deserving of notice, however, are the wonderful inventions of the late Sir Charles Babbage. During the construction, by the aid of Government, of his *Difference Engine*—a machine capable of managing series the differences of whose terms did not become zero till the seventh order of differences was reached—he was led to the conception of his *Analytical Engine*, which, being able to perform directly the operations of addition, subtraction, multiplication, and division, in any order the operator may please, can therefore deduce any result, however complex the operations in the calculation may be. It is to be regretted that Government did not take in hand this later development, or even continue the construction of the less costly *Difference Engine*, which is now lying an unfinished curiosity in the museum of King's College, London. Grant's *Difference Engine*, now being constructed for the University of Pennsylvania, is said to be less costly than Babbage's, and less complicated than Scheutz's, though, like the latter, it is furnished with an apparatus for printing the results it evolves. Of a different type of C. M. are the *planimeters*, or instruments for measuring the areas of plane figures. Of these the *Polar-planimeter* of Amsler-Lasson of Schaffhausen is the simplest in construction.

Calculus, or Stone, in medicine, the name given to a Concretion (q. v.) formed in the animal body of the consistence of stone. C. is chiefly formed of materials which are usually held in solution in one of the fluids of the body. C. is of two kinds, biliary and urinary; the former found in the gall-bladder or bile-ducts, the latter in the kidney or bladder.

1. **Biliary Calculi**, or gall-stones, are more frequently formed in the gall-bladder than in the substance of the liver. They consist chiefly of Cholestrine (q. v.), colouring matter, salts of lime, and magnesium, together with the acids of the bile and of fats. When single they are round or pear-shaped, sometimes resembling peppercorns; when more than one gall-stone are found in the gall-bladder, they generally have facets formed by



Calculus.

pressing and rubbing against each other. Biliary C. may exist in the gall-bladder without causing pain or inconvenience, but when one enters into the bile-duct it gives rise to incessant pain. This pain is felt most under the ribs on the right side, and is often accompanied by vomiting. If the stone remains impacted in the passage, jaundice is the result, and sometimes ulceration and death. If the stone finds its way into the bowel, the pain ceases, and the patient finds instant relief. Treatment consists in alleviating the pain with opiates internally, with poultices and hot fomentations externally.

2. **Urinary Calculi**.—These may be found in the kidney or bladder, hence called renal or vesical accordingly. Renal calculi are formed in the kidney, and generally consist of uric acid or oxalate of lime. This gives rise to severe pain in the loins, especially when the C. leaves the kidney and enters the Ureter (q. v.). The pain as it passes along this narrow tube is most intense, and is to be alleviated by opiates and hot fomentations. When such a C. reaches the bladder pain ceases, and the C. may be expelled with the urine, or it may remain in the bladder and become the nucleus of a vesical C., gradually becoming larger and larger by successive deposits of various salts; and thus, when cut into parts, a C. is often found to be composed of successive layers of earthy matters, forming what has been called *alternating C.* Sometimes the C. begins in the bladder by simple aggregation of small granules or gravel, and at other times, a foreign body introduced into the bladder forms the nucleus of the C. Not much is known regarding the origin of C. In some countries it prevails more than in others. It exists at all ages, from birth to old age. Sometimes C. exists without causing much inconvenience; generally, however, it gives rise to certain well-marked symptoms, of which the chief are gravel, severe attacks of pain in the region of the bladder, called 'fits of the stone,' aggravated by exercise, frequent passing of urine, and occasional stopping of the flow of urine during the act of micturition. By the introduction of a metal instrument into the bladder, called a 'sound,' the surgeon can detect the presence of a C. in the bladder. Treatment in the early stage consists in attention to diet; and, having ascertained by the microscope and by chemical tests the kind of C. or gravel present in the bladder, giving such medicines as will remedy the kind of gravel present in the urine. When the stone is too large to be passed by the Urethra (q. v.), it must be removed by Lithotomy (q. v.) or by Lithotripsy (q. v.). Frequently it is necessary to give opium or belladonna to relieve the pain caused by a C. Calculi vary in size from a small pea to a large orange. They have been classified according to their chemical composition into—(1) Uric acid C., by far the most common kind; contains also a little urate of ammonia. (2) Urate of ammonia C. This is a rare C., and is found only in children. (3) Mulberry C., so called from its resemblance to a mulberry, is composed chiefly of oxalate of lime, is very hard, forms slowly, and is always single. (4) Carbonate of lime C. is rare in man, but is frequent in the lower animals. (5) Fusible C., consisting of phosphates of lime, magnesium, and ammonia, is often large and very friable. (6) Cystic oxide C. is very rare, and consists chiefly of cystine, a peculiar waxy-looking transparent substance, which crystallises in hexagonal plates; and (7) Xanthic oxide C. This is the rarest of all calculi. See URINE.

Animals, and especially sheep, fed largely on beetroot and oilcake, are liable to an affection of this kind, which, if not attended to, finally closes up the urinary passage, and occasions death.

Calculus, Differential and Integral, unquestionably the widest and most important branch of mathematics, embracing as it does all the higher and more difficult developments and applications of Algebra (q. v.). As the heading implies, it consists of two divisions, distinctly separated—the one in fact being the inverse of the other. The *Differential C.* is concerned with the conception and investigation of certain *derivatives* obtained from their *primitives* according to some general principle; the *Integral C.*, on the contrary, endeavours, from the specified relations subsisting between these derivatives, to deduce, by strict mathematical processes, relations which hold between the primitives. The peculiar ideas involved in this C. were foreshadowed by Archimedes and other ancient geometers in their method of exhaustions (see EXHAUSTIONS, &c.); but their ignorance of

algebra greatly restrained their investigations. It remained for Newton and Leibnitz to establish, about the same time, and quite independently of each other, this invaluable method of analysis. Newton's conception was a kinematical one—i.e., he investigated the *rate* at which a given function of a continuously increasing variable increased or decreased (see FLUXIONS); and in the first section of the *Principia* he established the same on a firm geometric basis (see RATIOS, PRIME AND ULTIMATE). Leibnitz, again, investigated the increase or decrease which the same function suffered when the independent variable received an *infinitely small* increment. His method, however, bears the stamp of mere *approximation*, for he took account only of the term containing the *first* power of the increment, the others being proportionally inappreciable and neglected in consequence. A simple example will show the difference between these two ways of treatment. Let $y = x^3$; let x become $(x + \Delta x)$, where Δx is an infinitely small quantity; y then becomes $y + \Delta y = (x + \Delta x)^3 = x^3 + 3x^2\Delta x + 3x(\Delta x)^2 + (\Delta x)^3$, hence $\Delta y = 3x^2\Delta x + 3x(\Delta x)^2 + (\Delta x)^3$ according to Leibnitz; $(\Delta x)^2$ and $(\Delta x)^3$ being inappreciable. The expressions Δy and Δx are the *differentials* of y and x respectively. Following Newton now, let us suppose x to receive *any* increment Δx ; then

$$y + \Delta y = (x + \Delta x)^3 = x^3 + 3x^2\Delta x + 3x(\Delta x)^2 + (\Delta x)^3$$

therefore $\Delta y = 3x^2\Delta x + 3x(\Delta x)^2 + (\Delta x)^3$

or $\frac{\Delta y}{\Delta x} = 3x^2 + 3x\Delta x + (\Delta x)^2$.

Now find the *limiting* value of this expression as Δx diminishes towards zero; and thus we get the *differential co-efficient* of y with respect to x , or $\frac{dy}{dx} = \lim_{\Delta x \rightarrow 0} \frac{\Delta y}{\Delta x}$ (as Δx tends to zero) $= 3x^2$ ultimately. This result bears a great resemblance to the *differential* form; but it must be observed that $\frac{dy}{dx}$ is *not* a fraction—

it is the limit of a fraction. Lagrange, however, was dissatisfied with both of these methods, and gave another in his *Théorie des Fonctions*, which nevertheless contains implicitly the idea of *limits*, the one objection to Newton's reasoning. He assumed to have demonstrated that any function $\phi(x + h)$ can be expanded in an infinite series, in ascending powers of h , or

$$\phi(x + h) = \phi x + A_1 h + A_2 h^2 + A_3 h^3 + \dots$$

where A_1, A_2, A_3, \dots are functions of x only; and these he termed respectively the *first, second, third, &c.*, derived functions of ϕx . They correspond to the 1st, 2d, 3d, &c., differential co-efficients of ϕx with respect to x . The 2d differential co-efficient of y is $\frac{d}{dx} \cdot \frac{dy}{dx}$ or $\frac{d^2y}{dx^2}$ as it is written; and so on up to $\frac{d^ny}{dx^n}$.

The *Integral C.*, the inverse operation, has not been nearly so rapidly or completely developed as the *Differential*. It is of the nature of a *summation*, a fact still evident by the symbol of integration, which is a modification of the Old English \sum . It is entirely to the elder Bernoulli (q.v.) that we are indebted for the first systematic treatment of this part of the subject, in which they far outstripped Leibnitz himself. The general problem may be thus stated:—Required ϕx , such that its differential co-efficient may be the given and known $\phi'x$. The usual notation is $\phi x = \int \phi'x dx$. Simple as it may appear thus put, its difficulties are such as to be in many cases insurmountable, the integrable functions being few in comparison to the non-integrable. We cannot here enter into the various methods and artifices employed, for which we refer to the many excellent treatises on the subject, such as De Morgan's *Differential and Integral Calculus*, Todhunter's, Williamson's, Hall's, &c. See DIFFERENCES, DIFFERENTIAL EQUATIONS, FUNCTIONS, VARIATIONS, &c., for the more special departments of the C.

Calcutt's (from *Kali Ghatta*, i.e., the goddess Kali's *ghaut* or landing-place), the metropolis of British India, and capital of the province of Bengal, lies on the left bank of the Hoogly, 100 miles above its entrance into the Bay of Bengal. It is the residence of the Governor-General of India, and the Lieutenant-Governor of Bengal's official residence, Belvedere, is in the suburb of Alipore. It is the seat of the Government of all India, of the High Court of Justice, and of the Bengal Court

of Appeal; while, as the greatest Eastern commercial centre, it does one-third of the whole trade of India. C. extends over an area of 8 sq. miles, stretches some 5 miles along the river, is now lighted with gas, has an extensive drainage system, and receives a water-supply superior to that of London and equal to that of Glasgow. It has been called 'the city of palaces,' on account of its numerous fine buildings, of which the chief are the Government House, on the Maidan Esplanade ('the Hyde Park of India'); the Bishop's College, a fine Gothic building; the Town-hall, the Post-office, and the Mint, facing the river; the High Court, the University Museum, the Medical College, the Bank of Bengal, the Bengal Club, and the Cathedral. There are, besides, many other handsome buildings, comprising Hindu temples and Christian churches, but the mosques and Parsee fire-temple are mean. C. has a university, founded in 1857, on the plan of London University; the Bethune Society, intended to promote intercourse between natives and Europeans; a Dalhousie Literary Institute; the Bengal Asiatic Society, with a valuable library; the Government Presidency College, founded in 1824; the Free Church, General Assembly's, Cathedral Mission, London Missionary Society's, and Jesuits' Colleges, for the education of Christian teachers and native students; four first-class medical hospitals; and various educational institutions of a high character. It has twenty-three daily, weekly, and monthly newspapers, of which only five are in English; and nineteen magazines, of which several are native. Adjoining the river is the only defence of C., Fort William, the largest stronghold in India, the erection of which cost £2,000,000. The native portion of the town, despite recent improvements, is still miserable, the houses being constructed mainly of mud, mats, and bamboo. Many of these frail houses were destroyed by successive cyclones, and have been replaced by brick buildings. The cost of living in C. is cheap for India, and is not much in excess of that of European cities. There are abundance of handsome and well-stocked shops and bazaars. The principal manufactures are jute, gunny-cloth, oil, cotton, and sugar. The jute industry has rapidly developed of late years, and a great number of large power-mills have sprung up in C. and the neighbouring villages. The mills of Barnagore alone employ (1873) 17 European assistants and some 4700 natives, and yearly manufacture over 16,000 tons of jute into gunny-bags. In 1874 there were three large cotton-mills, each employing about 300 persons, and turning out yarn and cotton-thread largely for local use. There are also extensive flour and saw mills and shipbuilding yards. Among the chief exports are raw jute (in 1872-73, 7,080,912 cwts., worth £4,142,547), raw cotton (£4,000,000 yearly), indigo, opium, silk (9000 bales), tea, saltpetre, linseed, and indiarubber. In 1872-73 the value of gunny-bags, cloth, twine, and rope exported was £835,911. The trade in tea is steadily increasing, the value of the export for 1873-74 being £1,692,699, and the yield in Bengal for 1874 reaching 23,500,000 lbs. The total annual value of the foreign trade is about £40,000,000 sterling, of which nearly two-thirds is in exports, and rather more than one-third in imports, including treasure. The inland, river, and coasting trade is enormous, but statistics have hitherto failed to register it. The river at C. is nearly a mile wide, and is navigable for ships of 2000 tons. In 1872-73 there entered the port 1118 vessels of 992,211 tons, of which 342 were steamers, 161 native craft, and 91 Suez Canal steamers. C. has now railway communication with the N.W. Province, Bombay, and the junction of the Ganges with the Brahmapootra, on the way to Assam; while it has telegraphic lines to all the chief towns of India and Australia, and to Europe. It has become much more healthy of late years, a result greatly due to its receiving an effective drainage and a splendid water-supply in 1858. The water is now taken from the Hoogly, some 15 miles above the city. The mean temperatures of C. in December and May are 68° 5' and 85° respectively. The average rainfall is 66 inches, while the highest on record is that of 1871, when it reached 93·61 inches. Pop. (1872) 447,601, of whom 291,194 were Hindus, 133,131 Mohammedans, 869 Buddhists, 7265 Europeans, 12,315 mixed classes, and 1776 native Christians. The addition of the suburbs, comprising Chitpore, Sealdah, Bhowanipore, Alipore, Kidderpore, and, on the opposite side of the river, Sulkeah, Howra, and Seebpore, brings the pop. of C. up to 892,429, under three municipal corporations. The dominant native language is Bengalee, but English is used by a vast number of educated natives. In 1686 a

factory of the East India Company was established here by Governor Charnock, and in 1700 three adjoining villages were presented to the Company by the Emperor of Delhi. The settlement was then fortified, and called Fort-William in honour of the then King of England, but subsequently it received its present name, which had been that of one of the villages. C. was made the capital of a presidency in 1707, but it first figures in history in connection with the events of 1756. In that year it was attacked suddenly by Surajah Dowlah, and after a stout siege was shamefully deserted by the officers on duty. In two days more, disturbances within the town itself led to its surrender. Then followed the fearful tragedy of the Black Hole, when 146 English captives were forced into a room only 20 feet square, to pass one of the hottest nights of an Indian summer. On the following morning it was found that there barely survived twenty-three of the number. Eight months later, Clive and Admiral Watson rescued C., which soon afterwards entered on its modern career of prosperity. It was formed into a municipality after the Mutiny, having a body of commissioners, comprising the justices and a chairman named by Government. The actual income of the municipality at present is £270,000 (the nominal, £507,298), and its expenditure £436,108, while it has already a debt of £1,400,000, and a sinking fund for the payment of loans. In the course of his Indian tour, the Prince of Wales visited C. (27th December 1875 to 3d January 1876), where he met with a magnificent reception.

Oal'das, or **Calde'tas** (Lat. *calidus*, 'warm'), a name given to several places in Spain and Portugal where there are hot mineral springs, as *Las C. de Montibuy*, *Las C. de Malavella*, *Las C. de Raimbas*, &c. Colonists from the Peninsula have applied the word to corresponding localities in S. America.

Oal'der, a river in the W. Riding of Yorkshire, rises near Burnley; in Lancashire, and flows E. through the valley of Todmorden. At Wakefield it turns to the N.E., and after a course of 40 miles falls at Castleford into the Aire. As numerous canals are connected with the C., it is of great importance in the inland system of navigation through Yorkshire and Lancashire.

Oal'deron, **Don Pedro de la Barca**, a famous Spanish poet of noble family, was born at Madrid, 17th January 1600. He was educated at the Jesuits' Royal College there and at Salamanca University, served in the Spanish army of Flanders and Italy for ten years, became (after the death of Lope de Vega in 1635) superintendent of court theatricals to Philip IV., served also in the Catalonian campaign of 1640, took religious orders in 1651, and died 25th May 1681, chaplain of the congregation of San Pedro, Madrid. From the age of fourteen, while in the army, and after joining the Church, C. was engaged in dramatic composition. He left 120 comedias (of three acts each), 200 *lao*s or prologues, 100 *autos sacramentales* (sacred allegories), 100 *saynates* (humorous interludes), and many poems, songs, and romances. By the Schlegels and other German critics, C. has been placed among the first of dramatists; but Goethe's opinion that he is 'great in the technical and the theatrical' is more generally accepted. Skillful plot, bursts of passion, comic situations, a musical versification, are to be found in his plays; but he is 'the poet of the Inquisition,' without philosophy, moral enthusiasm, or deep sympathy with nature. *The Wonderful Magician* (in which Cyprian and Justina have parts like those of Faust and Gretchen), and *Life is a Dream* (translated into English by Oxenford), are the best known of his philosophical plays. Among tragedies (in which, however, the comic element is never wholly wanting), *The Physician of his own Honour* and *Jealousy the Greatest Monster* may be mentioned. The heroes, Don Gutierre and Tetrarch Herod, have been unjustly compared with Othello; but, with the suspicious Spaniard, jealousy is more a question of honour than of love. The independent peasant Crespo, and the amusing poor hidalgo Don Mendo, in *The Alcalde of Zalamea*, are also among C.'s best characters, although his intriguing comedies (called in Spanish, 'comedies of mantle and sword'), such as *The Secret in Words*, with the amusing Gracioso, or humorous valet, have been most successful. C. has left powerful historical plays, such as *The Constant Prince*, *Ferdinand of Portugal*, a Moorish story, which became popular on the German stage, and others on religious subjects, such as *The Devotion of the Cross*, and the *Pur-*

gatory of St. Patricius, in which the Catholic faith saves the most accomplished villains from their proper punishment. The best edition of C. is that of Hartzenbusch (4 vols. Mad. 1848-50). See Sismondi's *Hist. of Lit.* (vol. ii.); G. H. Lewes' *Spanish Drama*; French's *Life and Genius of C.* Two volumes of English translations have been published by M'Carthy.

Calderon, **Don Seraphin-Estevan**, a modern Spanish poet, born 1801, at Malaga, was a distinguished student at the University of Granada, where, in 1822, he was appointed Professor of Poetry and Rhetoric. His *Poesias del Solitario* (Mad. 1833) were published anonymously, were well received, and were surpassed by a second volume published in 1840. His articles on Andalusian manners, contributed about this time to a literary periodical (*Cortas Españolas*), are full of truth and humour. In 1834 C. was appointed auditor of the Army of the North, and in 1836 civil governor of Logrono. His literary employments at this time were the translation of Bonnin's *Principes d'Administration*, and the study of Arabic literature. Forced to return to Madrid in 1836, he there edited a collection of ancient Spanish literature, and projected a great critical work on the *Cancioneros* and *Romanceros*. His *Christianos y Moriscos* (Christians and Moors) is a romance in the spirit and style of Cervantes, and printed in the *Collection de Novelas originales Españolas* (Mad. 1838). A later work is his *Escenas Andalusas* (1847).

Oal'derwood, **David**, a Scotch Presbyterian minister in the reign of James VI., was born about 1575. He became minister of Crailing, Roxburghshire, about 1604, and thereafter showed himself a keen opponent of Episcopacy. In 1617 he was imprisoned for contumacy, and only liberated on condition of leaving the kingdom. Accordingly, he went to Holland (1619), where, in 1623, he published a work, in which he attacked Episcopacy generally, and especially the attempt to obtrude it upon the Church of Scotland. On the death of James he returned to Scotland, and lived for some time in Edinburgh, collecting materials for a history of the Church of Scotland during the reign of James VI., which he left in MS. when he died in 1651, and which his descendants presented to the British Museum. The MS. was first printed by the Rev. Thomas Thomson for the Wodrow Society (8 vols. Edinb. 1842-43). It is a work indispensable to every thorough student of Scottish history.

Caldie'ro (Lat. *calidus*, 'warm'), a village in the province of Verona, N. Italy, 8 miles E. of Verona by railway. It is the *Caldarium* of the Romans, and was much frequented on account of its hot springs till the 16th c. Here the French, under Napoleon, were defeated by the Austrians led by Alvinzi, in 1796, and again, under Massena, by the Archduke Charles, in 1805. Pop. 1600.

Oal'ea, a genus of plants belonging to the natural order *Compositæ*, natives of tropical America from Southern Brazil to Mexico. About thirty species are described. *C. Zacatechichi*, the 'Juralillo' of the Mexicans, yields in the fresh state a considerable quantity of camphor; the powdered leaves are applied to wounds, and the plant is used generally as a febrifuge. The leaves of *C. Jamaicensis*, when steeped in wine and brandy, are said to be used as a bitter stomachic in the W. Indies. Perhaps this account applies better to *Neurolema lobata* (*Treasury of Botany*).

Caledo'nia (popularly said to be a Latinised form of *Coil-dooins*, 'men of the woods'; but the first syllable may be a form of *gal*, and then the meaning might be 'Gael's of the dunes,' or hills), the name anciently given to the northern part of Scotland. The C. of Ptolemy probably lay between Loch Fyne and the Moray Firth; but the term seems to have been applied by the Romans to the whole country lying N. of the Wall of Antoninus. Tacitus speaks of the Caledonians as having large limbs and red hair, thence inferring that they were of Germanic origin; and Xiphilinus, in his epitome of Dion Cassius, says that they had neither walls nor cities, nor did they till the ground, but lived by pasturing cattle, by hunting, and on fruits. They were given to pillage and war, and fought from chariots with shields, spears, and daggers. Cn. Julius Agricola, the first Roman who encountered them, routed the united tribes under Galgacus at the *Mons Grampius*, 84 A.D. Their country, though overrun as far as the Moray Firth, was never reduced to a Roman province. In the Welsh poems and in Nennius the name is given to a region

south of the Forth. Arthur's seventh battle was fought in *silva Caledonia*, *id est, ex castris Caledon* (in the wood of Caledon, i.e., the battle of the wood of Caledon). Gradually it ceased to be applied to a particular district; but it is still used, especially in poetry, to designate the whole of Scotland.

Caledonian Canal, a ship-canal formed by uniting a series of lakes in Glenmore ('the great glen') in Inverness-shire by a navigable channel. Its object is to save sailing vessels the tedious and even dangerous voyage round Cape Wrath, but it is now largely used also for passenger traffic, especially in the summer, between the E. and W. coast of Scotland. It was originally surveyed by Watt and Jessop about 1773, but was only commenced thirty years later by Telford, under whom it was executed. Its construction occupied twenty years. Its total length is 60½ miles, of which the canal proper is 23 miles, the remainder being supplied by Lochs Ness, Oich, and Lochy. The canal is 120 feet broad at the water surface, and 50 feet at the bottom, and has an average depth of 17 feet. Its rise is 94 feet, and it has 28 locks, each about 180 feet long and 40 feet wide. The tonnage rates paid to the canal during the year ending April 1873 amounted to £4713, the number of passages being 1885. The scenery of the C. C. itself is very picturesque, especially at its western end, where it joins the sea-loch, Loch Eil, only three or four miles from Ben Nevis, and in full view of its precipices; and still greater beauty is to be found in the glens which open into it upon the northern side, and which lead into some of the finest parts of Ross-shire.

Cal'endar (Lat. *calendarium*), the register of the days, weeks, and months of the year. The earliest division of the year was probably into summer and winter, to which spring and autumn were afterwards added. The earliest systematic mode of reckoning time, however, was derived from the changes and phases of the moon; hence the division into moons, or months, and weeks. To this was soon added the division into years determined by the motions of the sun. The discovery that the solar year did not contain an exact number of moons necessitated some system of accommodation. For this end different plans were resorted to by different nations. The Jewish year consisted of twelve lunar months, with a thirteenth introduced at intervals. In most of the Greek states, the year was composed of twelve lunar months at a rough average of thirty days each; but, as early as the time of Solon (594 B.C.), it was known that the lunar month contained only twenty-nine and a half days. Reckoning the months of thirty and twenty-nine days alternately, the Greeks adapted the lunar year of 354 days to the solar year, by the addition of a month of thirty days three times in every cycle of eight years, thus making the average length of the year 365½ days.

The Roman year originally had ten months of 304 days, which Numa increased by the addition of two months (January and February), making a year of 355 days. This year was corrected by the addition of a short intercalary month called *Mercedonius* or *Mercedinus*, and remained in force till Julius Cæsar in 46 B.C.—known as 'the year of confusion'—corrected the accumulated error by the addition of sixty-seven days over and above the usual intercalary month, and fixed the length of the year at 365½ days, consisting of twelve months, with the names and number of days they still retain. Thereafter the ordinary year consisted of 365 days, every fourth being reckoned a leap year of 366.

The Julian year being in excess of the true solar year by 11' 12", in the course of centuries the accumulated error became considerable. In 1582 A.D. it amounted to ten days, when Pope Gregory XIII., assisted by a number of learned men, again re-adjusted the C. The mode adopted was to strike out ten days from the year, reckoning the 5th October as the 15th, and to obviate the recurrence of the error, he ordained that every fourth hundredth year should remain bissextile, while the intermediate hundredths should not; in other words, that the centuries, divisible without remainder by 400, should alone of the centuries be accounted leap years. Thus 1600, 2000, 2400, would be leap years, but not 1700, 1800, 1900, 2100, &c.

The mean Gregorian year consists of 365 days, 5 hours, 49', 12", being only 24" more than the mean tropical year, or one day in 3600 years. The change was at once adopted in the greater portions of Italy, Spain, and Portugal. France and the Catholic parts of Switzerland, Germany, and the Low Countries soon followed; but the Protestants in the last-named countries

did not give in till 1700, when *eleven* days (from the intervening 1600) instead of *ten* required to be deducted. The Gregorian or *New Style* was adopted in England in 1752, and in Sweden in 1753; Russia, and those parts of Europe where the Greek Church prevails, still hold to the Julian or *Old Style*. In 1793 the National Convention of France promulgated the C. of the Republic, instituting a new epoch, but it was abolished by Napoleon, 1st January 1806.

Calendar, a technical term in the criminal law of England. At the end of the assizes, the clerk of the assize writes four lists of the prisoners, with separate columns, containing their crimes, with the verdicts given and sentences passed on them, leaving a blank column, in which, if the judge has reason to vary the course of law, he writes opposite the names of the capital convicts 'to be reprieved,' 'respited,' 'transported,' &c. Each of these lists is called a C. The four, being first carefully compared by the judge and by the clerk of the assize, are signed by them, and one is given to the sheriff, and one to the jailor; the judge and the clerk of assize each keeping one. The C. forms the only warrant of the sheriff for execution; and if he receives no subsequent order from the judge, he carries out the sentence of the law, as directed by it. Forms regarding the C. are not quite the same in all counties. In Lancashire, one is not given to the jailor, and one is sent to the Home Secretary.

Cal'endering, an important operation in the finishing of cotton, linen, and other woven fabrics. The word literally means cylindering, and the operation consists in passing the cloth to be operated on through between a series of strong cylinders or 'bowls' powerfully pressed against each other by screws and levers. Calenders are generally made with three or five bowls; the bowls in the one case being two of solidified paper, not wood, or cotton, with an intermediate smaller one of polished metal, and in the other three bowls are of paper or cotton, and two of metal. Bowls used formerly to be made of wood, but their tendency to crack or twist from exposure to the heat of the iron cylinder led to their disuse in C. establishments. They are still in use, however, at bleachfields and printworks. In a five-bowl calender the cloth is twice pressed for one pressure it receives in the three-bowl machine. The object of C. is to flatten, smooth, and give a uniform surface to the cloth operated upon. For certain finishes the calender is specially adjusted and regulated. Embossing is not an operation of the calender, but of a distinct machine employed in a C. establishment. Glazing of furniture chintz is effected by introducing a rubbing motion or 'friction' as it is called, caused by the revolving of the bowls at unequal speed. In such cases the metal cylinders, which are made hollow, are brought to a high degree of heat, by admission of hot iron bolts, or steam, or gas. But C., generally speaking, embraces all the varied operations of finishing, clothlapping, pressing, and packing, the 'calender' giving the general name to the whole concern.

Cal'ends. Each month in the Roman calendar was divided into three periods by the C., Nones, and Ides. The C., so called because on the appearance of the new moon the priests summoned (*calare*) the people together to tell them the arrangement of the sacred and other days of the month, fell on the first; the Nones, from *nonus*, marked the *ninth* day, inclusive, before the Ides, and fell in March, May, July, and October on the seventh, the Ides being on the fifteenth; in the remaining months on the fifth, the Ides being on the thirteenth. The Ides got the name either from an Etruscan verb *idware*, to divide, because they halved the month, or from the Greek *idos*, the full moon being then visible. The Romans did not number the days forward as we do, but backward from the next division, reckoning inclusively—i.e., both extremes; thus the 31st of January was *Præidie Calendas Februarias*, the 30th *ante diem tertium Cal. Feb.*, and so on; and similarly with the other divisions. When an event occurred on the day of division, it was said to happen *Calendis*, *Nomis*, or *Idibus*, as the case might be. Rent, interest, bills, &c., were payable on the C.

Calendula, a genus of plants belonging to the natural order *Compositæ*. It gets its name from the fact that the species may be in flower on the *Calends* of every month. They are natives of the Mediterranean region. One (*C. officinalis*, or pot marigold) has been long cultivated, and was at one time famous as a diuretic remedy.

Calhoun, John Caldwell, an American statesman, born at Abbeville, in S. Carolina, 18th March 1782, of Irish parents. In the war declared in 1810 between the States and Great Britain, he found the opportunity for a political career. He supported Madison and the war party, and entered successively the Congress and the Committee on Foreign Affairs. The National Bank (Union), the Tariff of 1816, and the reorganisation of the War Department under Monroe's presidency, were some of C.'s achievements. He was Vice-President under Adams and Jackson, but in 1829 he almost provoked civil war in Carolina, Virginia, &c., by publicly declaring that these states were entitled to annul the new tariff of 1828, which he considered arbitrary and unjust. This principle of 'State-rights,' the Constitution being a mere treaty, he afterwards defended in the Senate; later he went the length of advocating the repeal of the Union, slavery being, in his view, an integral part of the social system in the S. This he insisted on still more after the Mexican war. C. died at Washington, 31st March 1850, leaving a work on the philosophy of government. His collected writings and speeches occupy 6 vols. (Cralle's ed.).

Calibre (Fr. *calibre*, introduced in the 16th c. from the Ital. *calibro*, and that from the Arab. *kālīb*, 'form or mould'), a technical name for the bore of a firearm. The C. of ordnance has been greatly increased of late years—that of the 35-ton gun is 12 inches, while the 81-ton gun measures 15 inches; on the other hand, European armies are generally equipped with small-bore rifles, in which the bore is less than half an inch. Figuratively, C. means the compass of mental or intellectual qualities.

Calico Printing, the art of printing coloured patterns on a kind of cotton cloth known as calico, from Calicut, a town in Hindostan, at one time celebrated for its cotton manufactures, and from which cotton goods were originally imported into this country. The process employed in C. P. is, with some modifications, available for printing several other kinds of textile fabrics, such as linen, silk, and mousselin-de-laine; but none of these fabrics are extensively manufactured into printed goods. The art of C. P. was practised by slow and laborious processes from very remote times in India, Egypt, and China, and the printed chintzes of the E. were among the early imports of the E. India Company. Towards the close of the 17th c. the art was introduced into Europe, but the importation of the process into England was strenuously resisted by the silk and woollen weavers, whose hostility culminated, in 1720, in their obtaining by legal enactment a prohibition from weaving all printed cottons whatever, either of foreign or domestic manufacture. It was not till 1774 that the Act was repealed, by which time the printing of mixed fabrics had been firmly established in Lancashire. In the year 1738 C. P. was commenced in the neighbourhood of Glasgow, and these two localities are now the chief centres of this industry in Great Britain.

The printing process was originally accomplished by means of hand-blocks made of wood, on which patterns or portions of patterns for each different colour were cut, and for some styles of work block-printing is still employed. The blocks were made of well-seasoned, hard wood, with a printing surface not exceeding one foot square, and the application of the block to the surface to be printed was guided by pin-points along the edges of each block. As a different block was required for each separate colour or mordant on the pattern, the printer had often to go over each piece with seven or eight different blocks, so that the number of individual operations in printing 25 yards of calico would amount to many hundreds of layings. For each printer an attendant or 'teerer' was required—a boy whose duty was to spread evenly the colour on a prepared smooth cloth surface, on to which the printer dipped his block. After carefully fitting the block so charged with colour into the guide-points made by the pins on the edge of the block, the workman struck it with the shaft-end of a small but weighty hammer, which transferred the impression to the cloth.

Under the name of a Perrotine, a complex block-printing machine was invented by M. Perrot, which is still used to a limited extent on the Continent. The machinery now almost universally used for the printing of calico, &c., consists of various modifications of the cylinder printing machine, in which a number of separate copper printing cylinders, called rollers, are mounted, corresponding to the number of colours to be printed. The patterns on the copper cylinders are prepared in some cases by

punching with a die directly on to the roller, or by engraving on a small steel cylinder and transferring the impression to another called a mill, from which it is impressed by a revolving motion under heavy pressure to the prepared copper surface. Patterns are also etched on the rollers with nitric acid, by lines cut into a specially prepared varnish, by means of Rigby's pentagraph machine.

An immense variety of styles of C. P. are pursued in practice, which it would be altogether unnecessary to enumerate here in detail. The number of materials used for thickening the mordants of colours, and of combinations of colours, is also far too varied to be separately enumerated. Briefly, it may be stated that the greater proportion of the styles fall under one or other of the following heads—1st, dye-colours; 2d, steam-colours. Dyed goods are the most ancient style of printing, having, according to Pliny, been practised by the ancient Egyptians. This style is chiefly produced with madder and its derivatives, garancine and alizarine, but also with many dye-woods. Alizarine has now been artificially prepared from anthracene, one of the many products of coal-tar; and it, as well as madder extract, is much used as a steam-colour. In the printing of a dye-colour, the pattern is printed on by a mordant, to which the dye is subsequently fixed by dyeing. The principal mordants used are acetate of alumina, or red liquor, giving a red or pink colour with madder; and iron liquor, or acetate of iron, which yields purple and black, according to the strength at which it is used. A mixture of these mordants gives various shades of chocolate, and there are several other mordants in use for giving different colours. These mordants are prepared with gum or some other thickening, and printed in the machine, after which the mordant is fixed by what is called ageing, in a chamber or machine in which the cloth is exposed to heat and moisture. After ageing, the goods are passed through a solution to remove the thickening material of the mordants—a process formerly accomplished by washing in a mixture of hot water and cows' dung, but now by means of arsenite or silicate of soda. The goods are now ready for dyeing, which is accomplished by passing the pieces for such time as may be necessary through a dye-beck, in which the dye-liquor is kept at the temperature required. After dyeing, the pieces are washed and cleansed by passing through soap solution of the requisite strength and heat, and then washed again, and squeezed to expel the greater portion of the water, and then dried. To improve the white ground, the goods are passed through a weak solution of chlorine, and then driven over steam cylinders; after which they may be starched in a starching-mangle, calendered, folded, pressed, and packed ready for the market. In the printing of steam-colours, the colouring material is applied to the cloth direct by the printing cylinder, and subsequently fixed by steaming, which causes the colouring material, by the preparation employed, to enter the fibres of the cloth and become more or less insoluble there, according to the nature of the colour used. Steam-colours have now become a very important branch of C. P., and are indeed in process of superseding most of the other styles, the brilliant coal-tar colours so extensively used being almost entirely fixed by steaming. The bodies used for fixing steam-colours are tin mordants, tannic acid, arsenite of alumina, and other mordants, which are mixed with the dye-colours and printed together. Albumen, lactarine, &c., are used for ultramarine and other pigment colours generally, the fixing in this case being due to the coagulation of these bodies on the fibre caused by the steam heat. Arsenite of alumina is chiefly used for the fixing of aniline colours. Spirit-colours are printed by a modification of the steam-colour process, but with strong solutions of acid mordant and salts mixed with the dyeing decoction. They form brilliant but fugitive colours. The effects of C. P. are varied by numerous other operations, such as printing with resist pastes, which prevent the dye-colours from impregnating the portions over which they are printed, and by discharging colour by means of acid and a chlorine solution, as practised in printing on Turkey-red grounds. See BANDANA.

The most important discovery of late years in the process of C. P. is that of printing madder and alizarine colours directly on to the cloth, which may be said to have revolutionised the trade; and this process is becoming every day of greater importance, and what a few years ago was considered an impossibility is now an accomplished fact.

Callic'ula, a name applied to several bracts in union at the basis of the calyx, the divisions of the C. being the same number

as the divisions of the calyx, and alternating with them. It is seen in *Potentilla*, *Geum*, Strawberry (*Fragaria*, particularly in *F. indica*), and allied genera, as well as in most *Malvaceæ*, *Dianthus*, &c.

Calicut, a town and seaport in the province of Madras, district of Malabar, 2 miles N. of Beypur, the present terminus of the Madras Railway. It lies near the mouth of a river of the same name, has few good buildings, and its harbour is now nearly filled up with sand, but there are still some exports of betel, teak, sandal-wood, wax, and pepper. C. gave its name to *calico*, which was first brought hence to Europe, Pop. 20,000. C., which is an ancient town, was visited in the 7th c. by a fanatical band of Moslems (*Moplas*) from Arabia, who settled here, and soon became the chief merchants and traders. It was the first Indian town at which Vasco de Gama touched, May 18, 1498, and it was then a great trading place, and the flourishing residence of the powerful prince Zamorin or Tamuri. It was captured and pillaged by Hyder Ali in 1773, and became British in 1792.

Cal'if (Arab. 'successor'). On the death of Mohammed in 632, there were four candidates for supreme temporal and spiritual power among his followers, now masters of Arabia—(1) Abu Bekr (or Father of the Virgin), father of Ayesha, the favourite wife of Mohammed, and who had accompanied him in his flight from Mecca, and was saved with him in the cave; (2) Omar, the father of Hafsa, another of Mohammed's wives, to whom had been entrusted the *Caaba*, or coffer containing the sacred revelations of the Koran; (3) Othman, who had married successively two of Mohammed's daughters; and (4) Ali, the husband of Fatima, the only surviving daughter of Mohammed, who was besides Ali's cousin-german. After a dispute between the Ausarians, or keepers of Medina (Mohammed's residence), and the Mohadjerins or refugees of Mecca (Mohammed's birthplace), as to which city should nominate Mohammed's successor, and a proposal that there should be two independent successors, Abu Bekr was chosen C. (or successor) at a meeting of principal men, and the principle was laid down that the supreme power was elective, and that every one assuming sovereignty without the public voice should suffer death. Abu expressly disclaimed the title of C. of God and his Shadow upon Earth, which was assumed by his successors. He accepted a small salary for himself, and the surplus funds accruing to his treasury were every Friday dispensed to the meritorious and the poor. Many Arabian tribes refused to pay the *Zacat*, or religious contribution of tithe, alms, and tribute. Abu nominated Omar as his successor, and this was confirmed by election. Omar received the title of Emir al-Mumenin, or Commander of the Faithful, which, altered into Miramamolins, was subsequently borne by all independent Moslem sovereigns. In this reign the great battle of Yermouh, which decided the fate of Syria, was fought (A.D. 636, 15th year of the Hegira); Manuel, the general of the Emperor Heraclius, was completely routed. This was followed by the invasion of Egypt, where Mokawhas, the leader of the Jacobite Copti, surrendered Memphis, probably from jealousy of the Greek Christians; Alexandria was taken, and its library destroyed. In the meantime the city of Bassorah had been founded on the united Euphrates and Tigris, and the battle of Kadesia (in which Yezdegerd, the last king of the Sassanids, was defeated) led the way to the conquest of Assyria, Persia, and, early in the following century, Transoxiana. Omar's age has been called the heroic age of Saracen history. He established the exchequer, which was now filled by the taxes of the newly-conquered district. After his death, the Council of Six Companions, whom he had appointed, chose as C. Othman, who promised to rule according to the Koran, the traditions of Mohammed, and the regulations made by the first two Califs (called the Seniors). The victories of Abdullah in Egypt, the 'gathering' of the Koran, and the conspiracy of Ibu Caba, mark this reign, in which, perhaps, the first vizier also appeared, taking charge of the C.'s correspondence, and characteristically joining in the cabal against him. The next C., Ali (the Lion of God), the first who bore the religious title of Imam, lost much of the temporal power. The party of Motazeli, or Separatists, joined with the insurgent Moawyah, the head of the family Ommiah, and Governor of Syria, and, after a mock arbitration, Syria became independent, and Egypt was lost. Ali's descendants were entitled to wear a

peculiar turban, and to the name of Sheriffs, Fatimites, and Emirs. The Ommiad dynasty of Califs (ruling at Damascus from 661 to 752) extended the Saracen empire in Africa from the Nile to the Atlantic. (See OMMIADES.) Constantinople was besieged, Galatia occupied, and Carthage taken. The Moors, or *Barbers*, adopted Mohammedanism, and, after two descents on Spain (710-711), the Gothic monarchy was destroyed, and Musa, in spite of the noble defence of the *Emirians* (the inhabitants of Merida, supposed to be descended from discharged Roman legionaries) and others, drove the Goths into the Septimania, the modern Languedoc. In 750 Al Heman (the As of Mesopotamia), the last of the Ommiads, was driven from Damascus by Abu Moslem, and the Abbasside dynasty, in the person of Abul Abbas, was founded. It removed the permanent capital to Bagdad, where it continued, as the supreme spiritual power, after it had lost all political importance, till the year 1258, when it was crushed by the Tartars. (See ABBASIDES.) In 1517 Selim I., the Turkish Sultan who conquered Egypt, assumed the title of C. In Spain, the Ommiad Caliphate was terminated in 1031, and the Moorish power gradually dwindled until the expulsion of the Moors in 1492.

California, one of the United States of N. America, is situated on the Pacific coast, and extends from 32° 45' to 42° N. lat., having an area of 188,981 sq. miles. A conspicuous feature of the region is the mountain range of the Sierra Nevada, which runs through the whole length of the state. Its highest peaks rise to a height of about 14,000 feet. A lower range runs along the shore, and between these two ranges lie the Sacramento and other valleys, containing the most fertile part of the state. The Sierra Nevada range exerts a great climatic influence upon the Pacific slope. The warm winds, laden with vapour from the ocean, here break upon this wall, and shed their riches upon the mountain sides and valleys. The climate of C. may be ranked as the highest or best in the United States; in many places it is a perpetual spring, and the land is covered with a vegetation of the greatest luxuriance. There are two seasons, the rainy and the dry. Agriculture was at first neglected, but it is now advancing rapidly, and, indeed, C. occupies a prominent place in the Union in this respect. The best wheat in the United States is raised here; the annual product in 1872 being 29,000,000 bushels, and it commands the highest price in the markets of Europe. In 1875 nine counties of C. had 19,798,290 grape vines, and it was estimated that 8,000,000 gallons of wine were made in the state.

C. was discovered by Cabrillo, a Spaniard, in 1542. It was colonised by the Spaniards last century, but in 1802, according to Humboldt, there were only 16,862 inhabitants, mostly converted Indians. The country fell into disorder under the successive anarchies of Mexico, and, after the war between that nation and the United States, it was ceded February 2, 1848, and admitted as a state, September 9, 1850. In May 1848, gold was discovered, and so enormously rich were the deposits, that not only was the country revolutionised, but the conditions of trade and commerce in the world were permanently affected by the discovery. The yield in Californian gold in 1869 amounted to \$21,472,851, and from 1848 to the present time it may be set down as about \$1,000,000,000. The yield of gold and silver in 1874 was \$20,300,531, and in 1875 \$17,753,151. The state also possesses mines of silver, copper, quicksilver, iron, platinum, and coal.

Since the opening of the Pacific Railway, C. has been much resorted to by tourists, attracted by the fame of its scenery. The Yosemite Valley, now a national pleasure park, possesses scenery of unique and wonderful character, with a waterfall of 2550 feet. The Pohono, or Bridal Veil, has a fall of 1000 feet. In Mariposa County there are also the largest trees in the world—the *sequoia gigantes*, one of them, 274 feet high, and the trunk 40 feet in diameter at the base. It is supposed to be 2000 years old.

The life of the country centres around the noble Bay of San Francisco, which is approached from the sea by the 'Golden Gate,' about a mile in width. The bay expands inward about 60 by 50 miles, affording space for the commerce of the world. The annual value of farming produce, according to the census of 1870, was \$49,856,024; the total value of all industries was \$182,000,000; the actual value of all property, real and personal, was \$638,767,017; the state debt was \$18,089,082. In

1872 there were 1013 miles of railway, and many thousand miles of artificial watercourses for mining purposes. C. has maintained a sound gold currency throughout. The principal towns are San Francisco, Sacramento City (the capital), and Stockton; and the chief river is the Sacramento, with its tributary the San Joaquin. There are several Catholic and Protestant colleges in C.; and general education is making progress. Pop. (1870) 560,247, including 49,310 Chinese, and in 1875 estimated at over 800,000, including 75,000 Chinese.

California, Gulf of, a deep inlet of the Pacific, lies between the peninsula of the same name and the Mexican mainland. It is 700 miles long, and from 40 to 100 broad, and receives at its head the Gila and Colorado. The gulf was first visited by Hernando Cortés in 1534, and received the name of Sea of Cortés.

California, Mexican, is the long peninsula projecting from the state of C., and separated from the mainland by the Gulf of C. It has an area of 61,545 sq. miles, and a pop. of 23,195. It is mostly desert, and is traversed by a mountain range, which occasionally rises to a height of some 5000 feet. Capital, La Paz (pop. 509). C. does not form a state of Mexico, but is simply a territory.

Caligula, Caius Cæsar Augustus Germanicus, the third of the Roman emperors, youngest son of Germanicus, was born at Antium, 31st August, A.D. 12. As emperor, his contemporaries called him Caius; the name Caligula, given to him while a boy by his father's soldiers in Germany, from his wearing the *caligæ*, or half-boots of the common soldiers, he took as an insult. After filling the offices of quæstor, pontiff, and augur, he was by the senate and people accepted (37 A.D.) as sole successor to Tiberius. For a few months he governed with admirable moderation and magnanimity, but a serious illness, the consequence of a life of unbridled licentiousness, destroyed his powers of dissimulation and self-control, and his subsequent life was a continued series of atrocities. He ordered his nearest friends to be put to death, or to make away with themselves; spectators in the circus were taken at random and thrown before the wild beasts; to give zest to his meals persons were tortured to death before his eyes; and he even expressed the wish that the whole Roman people had only one head that he might make an end of them by a single blow. C.'s lust was insatiable, and he committed incest with his own sister. He built a bridge of boats between Baïæ and Puteoli, across which, in imitation of Xerxes, he rode in triumph. He gave a magnificent banquet on the middle of the bridge, and by way of amusement caused numbers of the spectators to be thrown into the sea. He ordered divine honours to be paid to himself as to a god, and he raised his horse Incitatus to the consulship. After some years of prodigal expenditure, his mania assumed the form of avarice, and he extorted money by every expedient. He even instituted a brothel in his palace, and sent out his slaves to induce the public to patronise it. After the discovery of several schemes of assassination, he was at last put to death by Chærea, tribune of a prætorian cohort, 24th January, A.D. 41.

Calitri, a town of Italy, province of Avellino, on the left bank of the Ofanto, 32 miles E. of the city of Avellino, in a pastoral country. Pop. between 5000 and 6000.

Caliver, a kind of hand-gun, was of a size between the arquebuss and the musket.

Calixtines (Lat. *calix*, 'a cup'), the larger of the two parties into which the Hussites (q. v.) were divided in the civil war of the 15th c. Their deputies at the Council of Basle (1433) demanded that the Eucharist should be administered in both kinds (*sub utraque specie*, from which words they also got the name of Ultraquists, as C. from demanding *the cup*). Their demands being partially granted, a compromise was agreed to with the Romish party, which consequently absorbed many of the sect, while the rest joined the Taborites (q. v.).

Calixtus, the name of three popes and of one anti-pope.—**O. I., St O.**, or **Oallistus**, is said to have been born a slave at Rome about the middle of the 2d c. He was elected Bishop of Rome in the year 217, and held that office till the year 222, when he died a martyr. The character of C. has been the subject of keen discussion during recent years, on account of the abuse heaped on him in a Greek MS. found at Mount Athos in 1842, published in 1851 at the expense of the University of

Oxford, under the title *Philosophumena*, and ascribed by Hunsen to Hippolytus. C. was a zealous opponent of the doctrine of the Trinity, and took mild views of Church discipline, allowing priests to marry after ordination.—**O. II.**, Guido, Count of Burgundy, pope from 1119 to 1124, was, before his elevation, Archbishop of Vienne, and papal legate in France. In the year 1122 he concluded a treaty with the Emperor Heinrich V., by which he succeeded in reserving for the pope the right of Investiture (q. v.), and in 1123, the year before he died, held the first Œcumenical Council of the Lateran. C. acted as mediator in the dispute between Henry I. of England and Louis VI. of France regarding Normandy, paid the ransom for which Baldwin II., King of Jerusalem, was delivered from the Turks, repressed the tyrannous excesses of the petty Italian princes, and added to the adornments of the principal churches at Rome.—**O.**, the **Anti-pope**, Giovanni Unghieri, Cardinal-Bishop of Tusculum, was set up in 1168 by the Emperor Friedrich I. as a rival to his enemy, Pope Alexander III. Abandoned by the Emperor and his partisans after the peace of Venice in 1177, C. submitted to Alexander, who pardoned him, and appointed him governor of Benevento.—**O. III.**, Alfonso Borgia, a Spaniard, Bishop of Valencia, was elevated to the papal dignity in 1455. Before this event he had been long a trusted councillor of Alfonso, King of Aragon and the Two Sicilies, and had negotiated a peace between Castile and Pope Eugenius IV. A skilful diplomatist and subtle lawyer, he yet failed signally as a pope. Great efforts put forth by him to organise a grand crusade against the Turks ended in the capture of three useless islands. The open favour he showed his nephew, Rodrigo Lenzuoli, afterwards Pope Alexander VI. (see **Alexander VI.** and **Borgia**), lost him the esteem of King Alfonso, and aroused the hostility of his Roman subjects. The *Office of the Transfiguration* in the Roman Catholic service is ascribed to him. C. died August 6, 1458.

Calixtus, Georg, a German theologian, formerly of great mark, was born at Medelby, in Slesvig, 14th December 1586. He was the originator of the Syncretistic movement (see **SYNCRETISM**) which followed the Reformation on the Continent. Indocinated by his father, who had been a pupil of Melancthon's and imbibed his tolerant spirit, with the idea that all Christians might find common ground on which they could agree, C. was confirmed in his conviction by an extensive knowledge of the world and acquaintance with men of different creeds, gained in travelling. On his return to Helsingborg, where he had studied, he was elected (1613) to the chair of Theology, which he filled for forty-two years, till his death, 19th March 1655. During this time C. devoted all his powers to work out the idea of his life, seeking especially to reconcile the Lutherans and Calvinists. The last twenty years of his life were spent in controversy with the High Lutherans and the Jesuits, being regarded by the former as a renegade, and by the latter as an atheist. Among C.'s writings may be mentioned the *De Præcipuis Religionis Christianæ Capitibus* (Helmst. 1613); *Epitome Theologiæ Moralit* (Helmst. 1634); and *De Tolerantia Reformatorum* (Helmst. 1658). See Gass, *Georg C. und der Synkretismus* (Bresl. 1846); Henke, *Georg C. und seine Zeit* (2 vols. Halle, 1853-56). Henke also published his *Briefwechsel* (Halle, 1833). C.'s son, **Friedrich Ulrich** (died 1701), was also a Professor of Theology, published some of his father's writings, and defended the Syncretistic theology.

Call, the whistle used by the boatswain and his mates. Its use corresponds to that of the military drum and bugle, conveying special orders for hoisting, lowering, heaving, &c.

Call, i. according to the Scriptural or theological usage of the term, is the act of the Holy Spirit, or the divine influence by which men are brought into saving union with Christ, and translated from the kingdom of darkness into the kingdom of God. 2. There is a distinction made, however, between this effectual C. and the external C. in the Word of God, which is addressed to all. The latter includes (1) a declaration of the plan of salvation; (2) the promise of God to save all who accede to the terms of that plan; (3) command, exhortation, and invitation to all to accept of the offered mercy; (4) an exhibition of the reasons which should constrain men to repent and believe; all which are included in the gospel. 3. There is also a C. to office in the Church, which is marked by right motives in seeking it,

that is, by a desire not for the emoluments or advantages of the office, but to promote the glory of God and the salvation of men. See Hodge's *Systematic Theology* (1873).

Call of the House, a phrase applied to a measure taken to enforce the attendance of members upon their parliamentary services on urgent occasions. In the House of Lords, when, with a view to compulsory attendance, an order has been passed that the list of names be called over, the Lord Chancellor has sometimes addressed letters to the peers requesting their presence, as on November 1, 1810, when George III. was seriously ill. The bill for the degrading of Queen Caroline occasioned, in 1820, the most urgent C. of this house in modern times. In the House of Commons it is usual to name a day for the C., which will give members time to come from all parts of the country—a week or ten days being customary. The order for a C. has always appended to it, 'that such members as shall not then attend be sent for in custody of the sergeant-at-arms.' On the day appointed, the order, when read, may be proceeded with, postponed, or discharged, just as the house resolves. The names are called from the Return Book, according to counties, the names of which are arranged alphabetically—England and Wales first, then Scotland and Ireland. Formerly, fines and other punishments were inflicted for non-attendance; but latterly absentees have been dealt very leniently with, committal to the custody of the sergeant-at-arms, and the expenses incident to this commitment, being the heaviest penalty. Calls have fallen into disfavour: they can only compel a member to be present, not to vote. The last C. in the House of Commons was in 1836, when a motion on the pension-list was brought forward. See *A Treatise on the Law, Privileges, Proceedings, and Usage of Parliament*, by Sir T. Erskine May (7th ed. Lond. 1873).

Call to the Bar is the phrase employed in England and Ireland to denote the public reception of a student of law into the rank or degree of Barrister (q. v.). In Scotland the same process is termed *Passing Advocate*. See ADVOCATE.

Call'a, a genus of plants of the natural order *Orontiaceæ*, chiefly herbaceous marsh plants, natives of Northern Europe and N. America, and possessing acrid caustic properties. The rhizomes of *C. palustris* contain much starch, which can be obtained in an edible state by heating the ground-root stocks until their acrid qualities are dissipated. The meal thus obtained is nourishing, and in great popularity with the Laplanders, under the name of *Missebroed*—probably the Norwegian name for *C. Richardia Ethiopica* (the so-called 'Ethiopian lily') was long included under this genus, and is still so named by horticulturists. It is a native of Europe, Siberia, and N. America.

Call'ander, a village on the Teith, in Perthshire, 15 miles N.W. of Stirling, and a station on a branch of the Scottish Central Railway. From its vicinity to the Trosachs, and the other romantic scenery of *The Lady of the Lake*, it is much resorted to by tourists. Close by is the famous Pass of Leny. The new Callander and Oban Railway, though not complete, conveys passengers through Glen Ogle and along the banks of Loch Tay as far as Tyndrum. Pop. (1871) 1271.

Calla'o, a fortified seaport of Peru, and the great S. American station for war-ships, at the mouth of a river of the same name, 6 miles W. of Lima by railway. It has a splendid harbour and roadstead, sheltered by San Lorenzo island, and does an active export trade, chiefly in cotton, copper, bark, and hides. The only building of importance is the custom-house with its immense magazines. In 1746 C. was entirely destroyed by earthquake, and it has since suffered considerably from the same cause. Pop. about 20,000.—C. is also the name of a small island in the Chinese Sea, 16 miles from the mouth of the river Fai-Fo, with an area of 10 sq. miles.

Callian'dra, a genus of Leguminous plants, natives of America, from Buenos Ayres to California. Many are in cultivation, and in all about eighty species are known, all more or less ornamental. The Peruvian women deck their hair with the flowers of *C. trinerve* (the 'Seda sisa' or silk-flower).

Callia'no, a town of Austria, in the Tyrol, on the Adige, 10 miles S. of Trient, in the strongly fortified pass of Castel della Pietra, notable for the defeat of the Venetians by the Archduke Sigismund in 1487, and the storming of the place by Napoleon, September 4, 1796.

Callioh'thya, a genus of Teleostean fishes belonging to the family *Siluridae*, or 'sheat fishes,' which is represented by the more familiar *Silurus glanis* of European rivers. The body in C. is covered by rows of bony scales, which are of large size on the head. The mouth is of small size, and provided with minute teeth. These fishes, which inhabit S. American rivers, appear, like the *Anabas* (q. v.) or climbing perch of India, to leave the water, especially during the dry season, and to make their way over the land to other pools. Like the mud-fishes, they sometimes bury themselves in the mud of marshes and wet pastures. These fishes are also said to construct a kind of nest, in which the eggs are deposited, and watched by both the male and female during their development. In *Doras*, allied to C. in structure and habits, the side-plates are broad and spinous.

Callig'onum, a genus of shrubs belonging to the natural order *Polygonaceæ*, found in the Eastern Mediterranean region and in Central Asia. The acid fruits and shoots of *C. Pallasia* of the steppes near the Caspian Sea and the lower part of the Volga, are often eaten by the Kalmucks and other nomads to allay thirst. These tribes also obtain a nutritious gum like tragacanth by pounding and boiling the root.

Callim'achus, a distinguished poet and grammarian of Cyrene in Africa, son of Battus and pupil of Hermocrates, taught rhetoric and belles-lettres at Alexandria. Among his pupils were Aristophanes the grammarian and Apollonius of Rhodes. C. was a favourite of Ptolemy Philadelphus and his son, and held the office of librarian of the Museum, B.C. 260-240. Of his voluminous writings only a few poems, epigrams, and fragments remain. Catullus translated his poem on *Berenice's Hair*, and Propertius adopted him as his model. The style of C. is laboured and artificial. The best editions of C. are those of Ernesti (1761), Lœsner (1774), Volzer (1817), and Blomfield (1815).

Call'inger, a celebrated fortress of India, in Bundelcund, 112 miles S.W. of Allahabad, on a hill-top 700 feet above the surrounding plains. A decayed town of the same name lies at the S.E. base of the hill, and in the vicinity are the famous rock-cut temples of Siva. The British stormed C. in 1812.

Calling of the Diet is the Scotch law term for Arraignment (q. v.). Fifteen days before trial, a copy of the Indictment (q. v.), with a list of witnesses to be examined in support of it, and a list of the jury assize, must be served on the prisoner. On being placed at the bar, he is therefore presumed to know the charge made against him. If he or his counsel, however, desire it, the indictment is read aloud in open court. The prisoner must then state his objection, if he has any, to the relevancy. Should he do so, the court must consider the objection, which, if sustained, is fatal to the indictment; the prisoner being sent back to jail to await a new indictment, unless the prosecutor abandons the action, in which case the prisoner is discharged. Should the objection to relevancy fail, the prisoner must plead 'guilty' or 'not guilty' to the charge.

Calliope ('the beautiful-voiced'), in Greek mythology the Muse of epic poetry, and the mother of Orpheus, Hymen, &c. In works of art she appears seated and holding a writing tablet and stylus. As the chief of the Muses she is sometimes made their representative.

Callipers, an instrument like a pair of compasses with curved legs, used for measuring the diameter of bodies.

Callistemon, a genus of plants of the natural order *Myrtaceæ*, handsome flowering trees and shrubs of Australia. Many of them are cultivated in this country.

Callisthenes, of Olynthus, born about 360 B.C., was the son of Hero, a cousin of Aristotle, by whom he was educated at Stageira. A fellow-pupil of Alexander the Great, he accompanied that monarch on his expedition to India, B.C. 334. C.'s bluntness of speech, and his uncourtier-like rebuke of Alexander for presuming to claim divine honours, led to his imprisonment and death, B.C. 328. His historical writings have been lost, but the depreciatory criticism of Polybius, Cicero, and Strabo, would seem to make this a matter little to be regretted. Several MSS. in the Paris Library, professing to be the work of C., are spurious.

Callithrix. See SQUIRREL MONKEY.

Call'itria. See SANDARACH.

Call'ot, Jacques, a French artist, engraver, and designer of great merit, was born in 1592, at Nancy, where (after several visits to Italy) he settled and died in 1635. His numerous engravings, of which 1800 are preserved at Dresden, are invaluable representations of the life and manners of the 17th c. Perhaps the most famous of his productions are 'La Siège de Breda' (6 plates), 'Les Misères de la Guerre' (18 plates), 'Les Deux Tentations de Saint Antoine,' and 'La Grande et la Petite Passion.' See Maume, *Recherches sur la Vie et les Ouvrages de J. C.*; Green, *Description of the Works of C.* (Lond 1814); and De Haldat, *Notice sur C., considéré comme Peintre*, in the *Mémoires de l'Académie de Nancy* (1839).

Cal'met, Dom Augustine, a learned biblical writer, was born near Commerci, in Lorraine, 26th February 1672. In 1689 he became a monk of the order of St Benedict. Having mastered the Hebrew and Greek languages, he soon gained such an acquaintance with the Scriptures that he was appointed to teach the youthful alumni, first in the Abbey of Moyen-Montier, and then in that of Munster. The notes prepared for this purpose formed the basis of his *Commentaires sur tous les Livres de l'Ancien et du Nouveau Testament*, after the publication of which promotion rained upon him, and he died Abbé of Senones, 20th October 1757. C. was a voluminous writer, but his intellect was not equal to his industry; and his *Dictionnaire Historique et Critique de la Bible*, his *Histoire Universelle*, &c., have no real place in critical or historical literature. See Fange's *Vie de Dom C.* (1763), and C.'s *Autobiographie* in the Lorraine Library.

Calms, the name given to those regions intermediate between the latitudes of trade-winds and variable winds, where lengthened periods of perfect calm occur. They are dreaded by sailing vessels even more than storms.

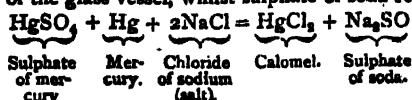
Cal'mucks. See KALMUCKS.

Oalne, a market-town of Wiltshire, on the Marden, and the terminus of a branch line of the Great Western Railway, 31 miles N.N.W. of Salisbury. It has a massive church, with a fine square tower, a town-hall, and an extensive flax-factory. There is also a considerable corn trade. Pop. (1871) 5315. C., along with part of Blackland and Calstone, returns one member to Parliament. Some Roman remains have been discovered at C., and here the kings of the West Saxons had a residence, but no trace of the dwelling exists.

Caloc'za, or **Kalocsa**, a town of Hungary, on the Danube, 69 miles S. of Pesth, in a region of marsh and malaria. It has a cathedral, and in the palace of the archbishop is a library of 30,000 volumes. Pop. (1869) 16,302. Near it is Hajos (pop. 3829), with the archbishop's summer palace.

Calomarde or **Calomarda**, **Don Francisco Tadeo**, Count, a Spanish politician, was born at Ville, Aragon, in 1775, studied at Saragossa, and passed as an advocate. After the return of Ferdinand VII., he was appointed to the highest office in the *Secretaría General de Indias*, but lost it for accepting a bribe. He turned to the Liberals, who would not have his support, then became reactionary again, and in 1823 was appointed Secretary of the *Cámara del Real Patronato*, and, shortly after, Minister of Justice. In this office he persecuted the Liberals, favoured the party of Don Carlos, recalled the Jesuits, shut the universities, and reopened the monasteries. C. had to flee from Spain in 1833 for advising the King to restore the Salic law, thus excluding Christina and securing the succession to Don Carlos. He died at Toulouse in 1842.

Cal'omel is a compound of mercury or quicksilver with chlorine, and is called by chemists subchloride of mercury or mercurous chloride. It has been used in medicine since the 7th c. It sometimes occurs as a mineral. It is prepared by several methods, the simplest of which consists in heating sulphate of mercury with metallic mercury and common salt in a large glass matrass. In this reaction C. is formed, and sublimes on the cool part of the glass vessel, whilst sulphate of soda remains.



The C. thus produced is powdered and repeatedly washed with water to remove *Corrosive Sublimate* (q. v.). C. is insoluble in water, but slightly soluble in acids. See MERCURY.

Calonne, **Charles Alexandre de**, born at Douai, 20th January 1734, began life at the local bar, and became Public Prosecutor and Master of Bequests to the local Parliament or court. After Turgot and Necker were dismissed, C., under the patronage of the Count of Artois, was appointed Controller-General in 1783, and immediately began to pay off debts and arrears, and to make large disbursements, especially to the court, the funds for which he obtained by reckless borrowing and additional taxation, and by anticipation of the revenue. Of most of his edicts the King had to compel the registration. With a deficit of 112 million francs, he called the famous Assembly of Notables of 1787, and submitted a plan involving the taxation of the landowners and clergy, and the abolition of feudal services and the salt tax. His inability to show a properly discharged account decided his fate, and he was exiled by the King to Lorraine. C. went to England, and, after an attempt to enter the States-General, attached himself to the Royalist party. His *Tableau de l'Europe en Novembre 1795* gave offence to his patrons, and in 1802 he obtained leave from Napoleon to return to France, where he died, 30th October 1802. His long published controversy with Necker is said not to clear him from suspicions of malversation.

Calophyll'um, a genus of plants belonging to the natural order *Celastraceæ*, containing about twenty-five species, chiefly natives of the eastern hemisphere, four or five being found also in America. The seeds of *C. Calaba*, a native of Brazil and the W. Indies, yields an oil which, in the latter country, is used for lamps. From the seeds of *C. Inophyllum* of the E. Indies and the Malay Archipelago is obtained a thick, dark-green, highly-scented oil, used for lamps and medicinally. Its timber is also valuable for mats and shipbuilding purposes generally, and the resin which exudes from the stem is sold as one of the kinds of E. Indian Tacamahac. *C. Tacamahaca* of Bourbon and Madagascar, *C. Brasiliense* of Brazil, and other species, yield a similar resin. *C. angustifolium* (the piney-tree) of Penang furnishes good spars, called *peon*.

Caloric, the name given to Heat (q. v.) when the latter was supposed to be a substance.

Caloric-Engine, a name given, not very happily, to an engine in which heated air is used as a medium for transforming heat into work. Merely as a fluid, air does not possess any advantages (for this purpose) over steam, the point in its favour being that its temperature can be raised indefinitely without increasing its pressure, while in the case of steam, the temperature and pressure increase together, the latter rising much faster than the former. The temperature to which the air in an engine is raised may be anything less than that which will injure the materials of which the machine is composed, while steam, before it had even approached such a temperature, would have attained a pressure which we should at present consider dangerous, and on this account its temperature has to be kept down. The importance of this difference will be realised when it is remembered that in any heat-engine (such as a steam or air engine) the proportion of the whole heat supplied, which can be turned into

work is expressed by the equation $\frac{T_1 - T_2}{T_1}$, where T_1 is the higher and T_2 the lower of the limits of absolute temperature between which the engine works. In a condensing steam-engine, working with steam of 75 lbs. per sq. inch pressure above the atmosphere, the value of the above fraction, which is called the maximum theoretic efficiency of the engine, is about 0.24, while in an air-engine, working between 190° and 900° Fahr., it is 0.54. In other words, if the same amount of heat be supplied to both these engines, the latter will be theoretically able to transform more than twice as great a part of it into work as the former.

In practice, however, no such result has ever been obtained, for steam is, in many respects, so much more easy a fluid to handle than air, that the ratio between the actual and the theoretical efficiency has always been much greater with the former than with the latter fluid. Certain constructive difficulties also—which we have not space here to describe—have prevented its permanent success, even in those cases where the best results

have been obtained, as in the case of Mr Stirling's engine at Dundee.

In order that any heat-engine may attain its maximum theoretic efficiency, it is necessary that all the heat received by the fluid should be received while it is at its highest limit of temperature, and all the heat rejected be rejected at its lowest limit. This is not the case in ordinary steam-engines, but the heat received below the higher limit bears but a small proportion to the latent heat of the steam, which is all received at the higher limit, and the loss of efficiency from this cause is therefore comparatively small. It is otherwise where air is the fluid used, in which case the non-fulfilment of the required condition entirely destroys the efficiency of the engine. The economiser, or 'regenerator' (an invention of Dr Stirling's), is an apparatus which enables this condition to be attained by alternately storing up and restoring to the air as much heat as corresponds to the difference between its limits of temperature.

In some air-engines the gases from the furnace are used instead of air with favourable economic results. Where, however, such engines have no 'regenerator' they cannot possibly be economical, and possess no advantage except the absence of a boiler, and of consequent risk of explosion. In Stirling's engine the air was used at a considerable pressure, the working cylinder was kept cool, and an economiser was applied. In an engine of Mr Shaw's, which attracted attention at the Paris Exhibition, an economiser was also employed, but the furnace gases were used instead of air, the pressure being therefore low, and the engine bulky. These two are the principal types of C.-E., but neither of them will come into use without much modification. If a successful C.-E. is ever to be designed, it must probably unite the advantages of both.

Calorimeter, an instrument for measuring the specific heat of a body. The apparatus is constructed with a view to eliminate as far as possible the effects of radiation, and is described in most text-books on physics. The determination depends upon the principle of latent heat, and is obtained by measuring the quantity of ice at zero Centigrade, which is converted into water through the transference of heat from the substance under consideration, which substance is at a known temperature. See HEAT.

Calot'ropia. See MUDAR.

Calott'istes (Fr. *calotte*, 'a small cap,' especially one worn by monks over their tonsure), a French association of wits and satirists, formed during the reign of Louis XIV., who indulged in the pleasantry of sending to public men who had made themselves ridiculous a patent to wear the monk's cap, as a hint that their weak point was exposed. Finally venturing to attack royalty itself, the association was dissolved by the minister Fleury. See *Mémoires pour servir à l'Histoire de la Calotte* (Basel, 1725).

Calotype, or **Talbotype**, a photographic process published in 1839 by Mr Henry Fox Talbot. As practised by the inventor, the method consists, in the first place, in the preparation of *iodised paper* in the following manner:—Brush one side of a sheet of writing paper of good quality with a solution of nitrate of silver, 50 grains to 3 oz. of water, and when dry immerse the paper for a few minutes in a solution of potassium iodide, 1 oz. in 1 pint of water; remove excess of potassium iodide by soaking the paper in water, then dry it. These operations should be performed by candlelight. The paper thus coated with yellow iodide of silver is very slightly sensitive to light, and if protected from sunlight will remain unaltered for any length of time. The second stage of the process consists in rendering the iodised paper highly sensitive to light by washing the paper with *gallo-nitrate of silver*, made by mixing, in equal parts, a solution of nitrate of silver (50 grains to 1 oz. of water), to which one-sixth part of glacial acetic acid has been added, with a saturated aqueous solution of gallic acid; then washing the paper with water and drying with blotting-paper. Daylight should be excluded during these operations. The C. paper is now ready for use, and so sensitive is it, that by exposure in the camera for less than a second to diffused daylight, a latent image is impressed upon it, which is developed by treatment with the gallo-nitrate of silver, then washing with water, and drying. The picture, which is a *negative* one—that is, the lights and shadows are reversed, can now be fixed by washing with a solution of bromide of potassium, 10 grains to 1 oz. of water, or

with hyposulphite of soda solution, 1 part to 4 of water, and afterwards with water. See POSITIVE PRINTING for the manner of obtaining positive prints from this negative. The original C. process just described has undergone several important modifications, but even the improved methods have fallen greatly into disuse.

Caloy'ers (a corruption of Gr. *kalos gerōn*, 'good old man'), are monks of the Greek Church, who belong to the order of St Basil (q. v.). They are divided into three classes—the *Archari*, or novices; the *Microchemi*, or ordinary monks; and the *Megalochemi*, who profess a higher standard of sanctity. Of their numerous monasteries, the most famous is that at Mount Sinai, founded by the Emperor Justinian. At Mount Athos they have twenty monasteries. There are also female C., or nuns, who, like the monks, follow the rule of St Basil.

Cal'pee, a town of British India, district of Jaloun, N.W. Province, on the Jumna, about 45 miles S.W. of Cawnpore. It has manufactures of cotton, paper, and sugar, the last of which is of extremely fine quality. Pop. (1872) 18,514.

Calpentin', a low peninsula running along the W. coast of Ceylon for a distance of 30 miles. It is transformed into an island during the prevalence of the N.E. monsoon.

Calpurnius, the *Gens Calpurnia*, an old Roman clan that claimed descent from Numa, but the Calpurnii were obscure till the time of the first Punic War.—**C. Calpurnius Piso** obtained the consulship in B.C. 180, and thereafter the Pisos were among the most illustrious families in the state.—**Lucius Calpurnius Bibulus** was Cæsar's colleague in the consulship, 59 B.C. His election was carried by means of the aristocratic party, that he might thwart Cæsar's agrarian law; but his efforts in this direction were unavailing. He was equally unsuccessful, while in command of Pompey's fleet in the Ionian Sea, in preventing Cæsar's crossing over into Greece. Lucius died 48 B.C. A celebrated lady of the clan was Calpurnia, the last wife of Julius Cæsar. In consequence of dreams of the previous night, she vainly endeavoured to dissuade her husband from leaving his house on the fatal Ides of March, B.C. 44. She was a quiet, home-loving, affectionate wife, who took no part in politics.

Calta'bello'ta (Arab. 'the castle of the cork-trees'), a town of Sicily, province of Girgenti, on a river of the same name, about 8 miles N.E. of Seiacca. It is built round an old castle on a rock which overhangs the river near its source. One of its churches, the *Chiesa Matrice*, is much admired. Pop. about 6000. C. was taken by the Saracens in the year 840.

Caltanisset'a, a fortified town of Sicily, capital of the province of the same name, on Monte Giuliano, about 28 miles N.E. of Girgenti, has a cathedral, numerous churches and convents, and salt and sulphur works. Pop. 16,563.

Cal'tha, a herbaceous marsh plant belonging to the natural order *Ranunculacea*. *C. palustris*, the marsh marigold, the May blobs, the *Populage* of the French, the *Sumpfdotter-Blume* of the Germans, is a common British plant, and is also found wild throughout almost the whole of Europe, Western Asia, and N. America. The flower buds are used as a substitute for capers. They have, however, no flavour of capers whatever, and are not free from acrid and poisonous qualities. The juice of the petals boiled with alum stains paper yellow. In N. America it is used as a potherb in spring when coming into flower. The C. of the Latin poets appears to be the common marigold. C. is the king-cup, water-golland, or yellow gowan of the Scottish peasant. The flower buds are 'the cuckoo buds of yellow hue' of Shakespeare.

Caluire, a fortified town in the department of the Rhone, France, on the left bank of the Saone, 3 miles N.N.E. of Lyon. It forms one of a series of forts in an *enceinte*, partly encircling Lyon, and stretching between the Saone and Rhone. Pop. of C. and Cuire (1872), 6773.

Calum'ba, or **Colombo**, the root of *Fateorhina C.* and *F. Miersii*, plants of the natural order *Menispermaceæ* (q. v.), externally used in medicine. It is now chiefly obtained from Mozambique, though, as the name expresses, it was at one time exported from Colombo in Ceylon. It is collected wild in the

woods. The roots are sliced and dried in the shade, and in this state it is exported. It then appears as a dry, very bitter-tasted, faintly aromatic substance. It owes its bitterness and tonic qualities to the alkaloid Calumbine or Berberia. It is also demulcent and non-stimulant, and hence can be employed when the stomach will refuse every other tonic. It appears also to possess certain narcotic properties. Diarrhoea and dysentery are the diseases it is most employed in. *Cocculus Indicus* (q. v.) also belongs to the same order, and possesses similar properties. The roots of *Fraseri Walleri*—sometimes called American or false C. root—is sometimes substituted for it, but it possesses different properties. At one time C. was believed to be got from *Cocculus palmatus* (*Jateorhiza palmata*). See FRASERA.

Calumet, a tobacco-pipe, consisting of a bowl of carved red steatite or other stone, with a reed stem 3 or 4 feet long, beautifully ornamented with feathers, dyed moose hair, porcupine quills, &c., used by the N. American Indians as an emblem of peace. It is held sacred to occasions of treaty-making, and as the 'pipe of peace' passes among the assembled chiefs, each takes a few whiffs, thereby giving a pledge of faith presumed to be inviolable.

Calvados, a part of old Lower Normandy, now forming a maritime department of France, lies between the departments of Eure on the E., La Manche on the W., Orne on the S., and is bounded by the English Channel on the N. Area 230 sq. miles; pop. (1872) 454,012. C. has mainly a flat surface, is watered by the Touques, Dives, Orne, Seules, &c., and is traversed by the Paris and Cherbourg Railway. The valleys are fertile, and produce corn, hemp, flax, and fruit; but the chief occupation is cattle-rearing and sheep-breeding, and the preparation of butter and cheese. C. has also many iron-foundries, coal-pits, and cotton-factories. The capital is Caen, and among the large towns are Bayeux, Pont L'Eveque, and Vire. The coast, which has few indentations, is rendered dangerous by its cliffs, sandbanks, &c. A long sunken reef, called *Rochers du C.*, from the name of one of the Armada ships wrecked here, gives to the department its name.

Calvaert, Dionys, the leader of the Bolognese school of art immediately prior to the rise of the Caracci, born at Antwerp in 1555, settled, at an early age, at Bologna, where he has left much good work, but is less known for the merit of his own pictures than for the celebrity of his pupils, among whom were Guido, Albani, and Domenichino. His best works are a 'Saint Michael' and a 'Purgatory,' both preserved at Bologna, where C. died, 1619.

Calvary is the Latin word *calvaria*, equivalent to the Greek *kranion* ('a skull'), used in Luke for the Hebrew *golgotha* ('of a skull') in Matthew, Mark, and John, and is applied to the place just outside Jerusalem where Jesus Christ was crucified. The popular notion which regards it as a mount is without any foundation.

Calventu'ra, or Broken Islands, nine in number, lie in the Bay of Bengal, 6 miles off the coast of Burmah, on the parallel of Bassein. The two nearest the shore are fertile, and are considerably the largest, though they have only a united area of some 4 sq. miles.

Calvi, a fortified seaport on the W. side of Corsica, in the Gulf of C., 38 miles W.S.W. of Bastia, with a good export trade. Pop. (1872) 1969. It was taken, after a siege of fifty-one days, by the English in 1794. Another C., the ancient *Cales*, is a town of S. Italy, province of Caserta, where the French gained a victory over the Neapolitan troops, 9th December 1798.

Calville, a kind of apple, of which there are numerous varieties. Its flavour somewhat resembles that of the strawberry or raspberry.

Calvin, John (whose original name was *Jean Cauvin* or *Chauvin*, Latinised into *Calvinus*), was born at Noyon, in Picardy, 10th July 1509. Having been from an early age destined for the clerical profession, probably on account of his correct conduct and religious susceptibilities, he was presented with a benefice at the age of twelve. By means of the income derived from this nominal office, he was able to proceed to Paris and enter on a course of regular study. At this period he was remarkable for his precocious intelligence and the wonderful progress he made in his

studies. About the age of twenty he obtained first one and then another living in the Church; but his studies for the Church were now interrupted for a time. There was at that time studying in Paris a fellow-townsmen and old companion, Pierre Robert, afterwards known as Olivetan, who had imbibed Reformed opinions on the subject of religion. C. was influenced by him so far as to take a distaste for the Church; about the same time his father came to the conclusion that the law would be a more profitable profession for him than divinity; so that, well pleased with his father's notion, he went to study law at Orleans. There he made such progress in his studies that very soon he was oftener employed as a tutor than as a student. He soon removed to the University of Bourges, where he was greatly helped by Wolmar, the Professor of Greek, the tutor of Beza, and one of the Reformed party. This worthy man gave him instruction in Greek, then a language understood only by the very learned, encouraged him in the study of the Scriptures, and confirmed him in his dissatisfaction with the Church of Rome.

On the death of his father he settled at Paris, where he became known as a Huguenot, and he would have been in considerable danger had he not been protected by the Queen of Navarre. A discourse which he wrote in 1533 drew upon him the charge of heresy from the Sorbonne, and he was obliged to flee. Under an assumed name (D'Espeville or D'Happeville) he withdrew to Angoulême, and spread the Reformed doctrines in Poitou and Saintonge. After some little time he returned to Paris, but soon found it advisable to quit France altogether, which he did at the age of twenty-five (1534), and settled at Basel.

When the French King was appealed to by the Lutheran German princes, his allies, regarding his violence against the French Protestants, he informed them that 'the French heretics had no resemblance whatever to the Lutherans, and that they were not mere seekers of reformed religion, but men disaffected to the state, enemies to law and property, firebrands, and Anabaptists.' It was in answer to this slander that C. prepared his *Christiana Religionis Institutio*, the greater part of which was composed in his retreat at Angoulême, and which, considering its excellent Latinity, its severe logic, and its range and force of thought, as well as its fame and effects, must be regarded as perhaps 'the most wonderful literary production by a young man under twenty-six recorded in history.' It was published at Basel, first anonymously, in 1535, and then in 1536 with his name and a preface, in which he dedicated it to Francis, and defended the Protestants in reference to the charges made against them by the King. Immediately after the publication he left Basel, travelled in Italy, visited Paris, and was returning to Basel through Geneva when he was stopped at that place. At Geneva the Reformed religion had been legally established, its chief expositor being Farel (q. v.), with whom Viret (q. v.) had at first been associated; but as the latter was absent from Geneva at the time, Farel was greatly in need of help, and C. was induced to take Viret's place. The story usually told about the forcible entreaties which Farel found it necessary to use on the occasion, does not seem natural or probable, considering C.'s character and the position he was in and aspiring to at the time. At any rate, he settled at Geneva in September 1536, and from that time became the head of the French Protestants. He was their guide and counsellor, and so great was his influence with them, that towards the middle of the 16th c. they got the name of Calvinists.

In conjunction with Farel, C. now drew up a plan for the government of Geneva, which was passed into law; but which, when the attempt was made to put it into execution, was felt by the citizens to be so intolerable that they rebelled, and drove Farel and C. from the city (1538). C. then took up his abode at Strasburg, and became pastor of a congregation there. At the same time he kept up his interest in the Genevese, and by his letters effectually counteracted the vigorous efforts which were made after he left to bring them back to the fold of the Romish Church. The consequence was that in 1541 he was invited back to Geneva, and at once became the virtual ruler of the city, and so he remained till his death, 25th May 1564.

The idea that C. desired to carry out in the government of Geneva was the same which Augustine held—namely, that of a Theocracy; and his aim and ambition was to make it a model city, an example to the whole world. The Church was over all, and the civil power was simply her instrument in enforcing her

moral code; the anomaly of the system being, that the authority of the Church was made to extend not only over her own members, but over the whole community. The government was administered by a consistory composed of six ministers and twelve elders, who met every week, and inflicted severe penalties on offenders against the moral law, as well as against the strict rules drawn up for the regulation of conduct and manners.

The character of C. has been very variously judged, for he has been alternately loaded with obloquy by his enemies, and extravagantly eulogised by his friends. On the whole, he seems to have been a man to fear or reverence, but not to love. He had a prodigious memory, a keen understanding, and a will of iron. His habits were frugal and simple to the last degree. The favourite point of attack upon him by his enemies, as well as that which his friends have felt most embarrassment in defending, while impartial writers speak of it as the one blot on his character, is the burning of Servetus (q. v.). The defence usually made for the share he is alleged to have taken in the transaction—namely, that he 'acted as informer, prosecutor, and judge'—is, 'that such a thing was then a matter of course, that all parties in those times considered it the duty of the magistrate to extirpate opinions deemed erroneous,' and so forth. Now what we have here to do with are simply facts; and it seems to be at least doubtful whether C. actually played the part which is implied in the discussion. Servetus had previously been condemned by the Catholic doctors at Vienna, rightly or wrongly, for Pantheism and Unitarianism; and it is a remarkable fact that in the 16th c. C. was more strongly attacked by Catholic writers for having solicited his acquittal than afterwards for having condemned him. It further seems in the highest degree improbable that he could have played the part which it is generally assumed that he did, and also have written the following passage, which occurs in his work a *Defence of the Secret Providence of God* (p. 128): 'For what past act of mine you accuse me of cruelty I am anxious to know. I myself know not that act, unless it be with reference to the death of your great master, Servetus. But that I myself earnestly entreated that he might not be put to death his judges themselves are witnesses, in the number of whom at that time two were his staunch favourers and defenders.' Besides the *Institutio*, C.'s most important works are the *De Necessitate Reformanda Ecclesia*; *In Novum Testamentum Commentarii*; and *In Librum Geneseos Commentarii*. The most complete edition is that of Amsterdam (9 vols. 1671), but no thoroughly critical edition of his entire works has yet been published, though one was begun in Germany in 1863, by Baum, Cunitz, & Reuss. There is an English translation, published by the 'C. Translation Society' (51 vols. Edinb. 1843-55). C.'s Letters, collected and edited by Dr Jules Bonnet, have also been translated into English by Constable (2 vols. Edinb. 1855-57). His life has been written by Beza and Bolsec in Latin; by Henry in German, *Das Leben C.'s des Grossen Reformators* (3 vols. Hamb. 1835-44), and by Audin in French, *Histoire de la Vie des Ouvrages et des Doctrines de C.* (2 vols. Par. 1840; 3d ed. 1845).

Cal'vinism is the system of doctrine professed by the Churches called Reformed, as distinguished from the Lutheran and Anglican, and is so called because based upon Calvin's *Institutes* (see CALVIN). C. is simply a revival of the scheme of doctrine originated by Augustine (q. v.). The two postulates of that scheme were *original sin* depending on the fall, and the *irresponsible sovereignty of God*. From these premises it was argued by Augustine that an absolute election on the part of God of certain individuals to eternal life was not unjust, since, all being transgressors, all might justly have perished; and it necessarily followed that all the rest were *reprobated* to eternal damnation. The character of God as a righteous judge was, at the same time, vindicated, according to the scheme, by the expiation made for the sins of the elect in the *Atonement* (q. v.) of Jesus Christ. And, to complete the scheme, that the elect might be benefited by the atonement, the inclination to appropriate it is produced by the *irresistible grace* of God, which brings them into such a condition that their *perseverance* in holiness is certain, and they cannot finally fall or be lost. Augustine developed his system in upholding *free grace* against *works* in his controversy with Pelagius (q. v.). The same controversy was carried on within the Roman Catholic Church between the Franciscans and Dominicans; it was the subject of

the doctrinal part of the battle at the Reformation, and was kept up even among the Reformers; for Calvin, Beza, and Knox took the Augustinian view, while Luther, Erasmus, Melancthon, Latimer, &c., opposed it. See Hodge's *Systematic Theology* (1873).

Calw, or **Kalw**, a town in the circle of the Black Forest, Württemberg, on the Nagold, about 20 miles W. of Stuttgart. It has cloth and woollen factories, tanneries, dyeworks, cigar manufactories, a fruit-market, and a large timber trade. Pop. (1871) 5582. C. was destroyed by the Bavarian general Von Werth, after the battle of Nordlingen in 1634, and again in 1692 by the French under Melac.

Calycantha'cese, a natural order of shrubby plants resembling the *Rosaceæ* (q. v.), natives of N. America and Japan. There are two genera, *Calycanthus* (q. v.) and *Chemonanthus*, including in all six species.

Calycan'thus, a genus of shrubs of the natural order *Calycanthaceæ* (q. v.), found in N. America. *C. Floridus* is the 'Carolina allspice.' Its wood and roots have a camphor-like odour, and are used in the United States as a substitute for cinnamon. It is often cultivated in our gardens. *C. occidentalis* is found in California. The other species are natives of Japan.

Calydon'ian Boar, according to the Greek myth, a ferocious monster sent by Artemis to ravage the territory of Ceneus, King of Calydon, who had failed to sacrifice to her. Meleager, the son of Ceneus, having invited to his aid the bravest heroes of Greece, slew the boar with his spear, and to him accordingly fell the trophy of the head and skin. A later form of the myth represents Atalanta as having inflicted the first wound, and to have been, on that account, gifted by Meleager with the skin.

Calym'ene, a genus of *Trilobites* (q. v.), or extinct Crustaceans, the fossil remains of which occur from the Lower Silurian to the Upper Silurian. *C. Blumenbachii* is the best-known species. These forms possessed thirteen rings in the exoskeleton or shell, and the body was in many cases indistinctly divided into three lobes. They possessed the power of coiling their bodies up into a ball-like form, after the fashion of the living Woodlice (q. v.). The family *Calymenida* itself includes another genus (*Homalotus*), and the entire family ranges in time from the Lower Silurian to the Devonian formations.

Calyp'so (from *kaluptō*, 'to conceal,' because she kept Ulysses, as it were, hidden from the outer world), according to the Homeric legend, was a daughter of Atlas, and inhabited the island of Ogygia, on the shores of which Ulysses was shipwrecked. Smit with love for the hero, she promised him eternal youth and immortality if he would marry her; but after retaining him for seven years, she was ordered by Hermes to let him go.

Calysac'cion, a genus of plants belonging to the order *Guttifera* or *Clusiaceæ*, which along with those of *Mesua ferrea*, the dried flower-buds of *C. longifolium*, form the *Nagasar*, *Nag-Kesar*, or *Nag-Kassar* of the Indian bazaars, so highly esteemed for their fragrance, and in Bengal as an antidote to snake-bites. *Nag-Kassar* is also used to dye silks.

Cal'yx, the outer covering of the flower, usually green, and composed of sepals, either separate or united (Dialypetalous or Gamopetalous). In the division *Monocotyledons* (q. v.), the C. only is present; in this it is usually bright-coloured. In some dicotyledons (e.g., the fuchsia) it is also *petaloid*. It may remain persistent until the fruit is ripe, as in *Physalis* (the winter cherry), when it is enlarged and bright-coloured; be *caducous*, or fall after the flower expands, as in Poppy; or *deciduous* (falling when the flowering is over), as in *Ranunculus*. In the rose it constitutes the *hip*, the real fruit being the seed-like achenes in the interior. In the apple it also joins the expanded peduncle to form the fleshy portion of the fruit.

Cam (Celt. 'crooked'), or **Granta**, a famous English river, formed by the union of several streams, one of which rises in the N. of Essex. They join near Grantchester, a little to the S. of Cambridge, after which the river, henceforth known as the C., flows N.N.E. past Cambridge, and falls into the Ouse, in the Fen country, after a course of 40 miles.

Cam, in machinery, an irregularly shaped revolving disc, used for imparting motion with definitely varying velocity.

Camai'eou (Old Fr. *camahou*, Low Lat. *camahutus*, a stone engraved in relief, a cameo), and **MONOCHROME** (Gr. 'one colour'), in painting, is a style of producing pictures in one colour only—the different tints of nature being indicated by varying gradations of the single colour, by light and shade, different methods of handling, &c. The paintings of the ancients were executed in that variety of C. or monochrome which is known as *en grisaille*. Drawings in Indian-ink, red chalk, pencil, &c., may be classed as works *en C.*

Camaldolites, an order of monks, now almost extinct, founded in 1018, at Camaldoli, near Arezzo, by St Romuald, a Benedictine, who belonged to the noble family of the Dukes of Ravenna. Originally they pursued a strictly solitary life, but as their corporate wealth increased, they relaxed the strictness of their practice, and divided themselves into recluses, observantists, and conventualists, who, in 1513, were again united into one order under a 'Major,' who lived at Camaldoli. The C. had at one time a footing in France, Germany, and Poland, as well as in Italy. From the first three of these countries they have now disappeared, and even in Italy they scarcely exist. Pope Gregory XVI. was a Camaldolite.

Camarrilla (a diminutive of the Span. *camara*, 'a chamber'), originally denoted the private room of the King of Spain, where he received his intimate personal associates, as distinguished from the *Camara*, the royal or state chamber. The word passed into the political language of Europe, and was then used to denote the secret influence exerted over a monarch by his private favourites in opposition to his public ministry or constitutional advisers. The force of public opinion is happily now so great that not even a Spanish monarch could safely venture to despise it, or lend his ear to mere courtiers.

Camassia, or **Gamassia**, the Camass, or Quamash (as it is sometimes erroneously written), a genus of plants belonging to the natural order *Liliaceæ*, natives of open prairies and grounds in N.-Western America, from California to the northern parts of British Columbia, and from the sea to the Rocky Mountains. The only known species is *Gamassia esculenta*, the bright blue flowers of which give the open country a gay appearance in spring. The plant is about a foot or a foot and a half in height, and has been introduced into our gardens. But it is the bulbous roots that render the plant of most interest. They are collected and stored by the Indians for winter food, and are nourishing from the amount of starch which they contain. The bulbs are dug up with a sharp-pointed stick as soon as the flowering is over. The gamas-gathering is one of the Indian festivals. Numbers gather for this purpose from far and near, and encamp in the woods and plains close by. The work is chiefly done by the women, and, from early morning to dusk, they are busy at it. The young men meanwhile look on, and the hard-working squaw has the best chance of a husband. The roots are cooked by being put into a hole in the ground paved with large stones, in which previously a fire has been lit. The roots are then piled layer upon layer in it, the different layers being separated by leaves and branches, until the hole is full. Earth is then spread over it, and a fire lit on the surface. After they are cooked, they are either pounded into cakes, or more frequently dried for winter use. They are then, by the conversion of the starch into sugar, sweet tasted. There is also a white-flowered variety. See Geyer, Hooker's *London Journal of Botany*; Brown, *Trans. Bot. Soc. Edinb.*, vol. ix.

Camba'cères, Jean Jacques Regis de, a French statesman and juriconsult, was born at Montpellier, 18th October 1753. Adopting the principles of 1789, he was elected (1792) deputy for L'Hérault to the National Convention, which appointed him secretary in January 1793, in spite of the suspicions of the 'Mountain,' excited by C.'s suggestion that the King's execution should be delayed. In this position he denounced Dumouriez, voted against the Girondins, and made, along with Merlin, a report on the civil legislation of the Revolution, in which he proposed to give rights of succession to illegitimate children, and to introduce civil trial by jury. On the death of Robespierre, C. became President of the Assembly and of the Committee of Public Safety, and adopted a moderate policy. In 1795 he was elected Secretary to the Council of Five Hundred under the Directory. Returning to the practice of law in 1797, he again emerged into public life as Minister of Justice under the new

Directory of Sieyès—a post which he retained under the Consulate till he became Second Consul in 1800, Bonaparte and Lebrun being his colleagues. C. firmly opposed the judicial murder of the Duc d'Enghien. He now completed the Civil Code and Code of Procedure. Under the Empire, as Arch-Chancellor, he presided in the Council of State. He was an able administrator, and frequently (as in opposing the divorce and the Austrian alliance) gave the Emperor good political advice. In 1814, C. adhered to the resolution of the Senate recalling the Bourbons. On Napoleon's return, he became nominally Minister of Justice (the work being done by Boulay de la Meurthe). In spite of his moderation during the 'Hundred Days,' Louis XVIII. banished him as a regicide; but in 1818 he was restored even to his title of 'Duc de Parma.' C. died at Paris, 8th March 1824. See Aubriet's *Vie de C.* (2d ed. 1825).

Cambay (Ind. *Kumbaya*, anciently *Khumbarati*, 'the city of the pillar'), a once famous trading town, still the capital of the small tributary state of the *Brûe*, lies at the head of the bay of the same name, on the estuary of the Myhee, 40 miles N.N.W. of Baroach. Its only important buildings are the Nabob's palace, and a large and beautiful mosque, originally a Hindu temple. C. is surrounded by a wall 3 miles in extent, with fifty-three towers. It has some exports of grain, cotton, and ivory, but its harbour has filled up with sand of late years. It is celebrated, however, for the manufacture of articles in carnelian and bloodstone. Pop. 10,000. The *state of C.*, feudatory to Bombay, has an area of 350 sq. miles, and a pop. (1872) of 83,494. It pays a tribute of £2700, and supports 800 armed retainers. The *Gulf of C.* (ancient *Sinus Barygaenus*), an inlet on the E. side of the Gujerat peninsula, is about 100 miles long, and from 70 to 20 broad, and receives the Nerbudda, Tapti, Sabarmutti, Myhi, Gooma, Setrooji, &c. In ancient times and during the middle ages, the region round this gulf was the seat of the rich Indian commerce with the Western world.

Camberwell, a suburb of London, on the S. side of the Thames, formerly a rural parish embracing the suburban districts of Dulwich, Herne Hill, and Peckham.

Camberwell Beauty (*Vanessa Antiopa*), a species of Butterflies (q. v.), or Lepidoptera, found in Britain, but more common in Southern Europe, and possessing wings of a dark-brown colour, banded with black, and interspersed with blue spots. A yellow band with black spots encircles the black band. The wing-margin is denticulated or irregularly toothed. The antennæ are terminated by knobs. The larvæ are generally found on the leaves of the willow, and are of black colour spotted with white, and with red spots on the back. The popular name of this butterfly was given to it from its being formerly found among the willow copses of Camberwell.

Cam'bio (Ital. 'exchange') and **Cam'biat** ('money-changer') are terms formerly used to denote a book in which the moneys, weights, and measures of various countries are given in the equivalents of a particular one. The use of Italian terms is explained by the position Italy long held in the European commerce of the middle ages.

Cam'bium (Lat. *cambio*, 'I change'), the viscid, mucilaginous fluid interspersed between the wood and bark of exogenous trees, and particularly abundant in spring. *C. cells* are formed in it, out of which young wood on one side and young bark on the other are formed, but the nature of the C. is still an undecided question in physiology. See BARK and STEM.

Cambod'ja, a maritime kingdom in the S. of the Indo-Chinese Peninsula, under the protectorate of France, bounded on the S.W. by the Gulf of Siam, and on the S.E. by the French colony of Lower Cochinchina. Area, 32,380 sq. miles; pop. (1874) 888,239, including 40,000 slaves, and 20,000 semi-independent savages, who inhabit the mountains. In the N. and N.W. the surface is mountainous, elsewhere the land is flat, and the soil, mostly a rich alluvium, is abundantly productive. The great rivers Mekong, the Mesap, and their affluents, are the chief streams, and on the N. frontier, partly in C., partly in Siam, is Lake Thalaysap (Sweet-Water Lake), 90 miles in length, 8 to 22 in width, and on an average 6 feet in depth. The principal products are rice, areca-nuts, betel, spices, gamboge, sandal-wood, and ivory. There are extensive forests,

which shelter deer and elephants; horned cattle breed on the plains, and there are hogs, goats, and poultry. Iron occurs.

History.—The Cambodjans know nothing of their origin or early history. According to the Chinese authorities, C., which they name Tchila, began to pay tribute and to send ambassadors to the Son of Heaven as early as A.D. 616. In the 10th c. C. had become a powerful kingdom, and in the 12th c. it conquered Anam, and established itself as the chief power in the Indo-Chinese Peninsula. It was invaded by Kublai Khan in the latter part of the 13th c., and although the great Mongol army was compelled to retire without effecting a conquest, the Cambodjans continued from this date to pay a nominal tribute to China. Early in the 18th c., C., being then hard pressed by the Siamese on the W., called in the aid of the Anamese from the E. The Anamese came to succour, but remained to rule; for, after driving out the Siamese, the King of Anam exacted from the Cambodjans an acknowledgment of suzerainty in 1717. In 1750 the Anamese seized all the provinces lying upon the Saigon river. Near the close of the 18th c., the country came under the protection of Siam. From this period C. continued to be torn and ravaged by Siam and Anam in turn, and in 1809 an Anamese army marched into C., and occupied Penomping, its capital. All the six provinces of which Lower or French Cochinchina (q. v.) consists formerly belonged to C., but were captured by the Anamese, and afterwards compulsorily ceded to the French. From the time that the French first settled upon the peninsula, it was evident that peace and progress were to be secured for the colony only by guaranteeing the independence of C. against the incursions both of Siam and Anam. Accordingly the governor of the French colony of Cochinchina assumed the suzerainty of C. in 1863. See *Travels in Indo-China and the Chinese Empire*, by Louis de Carné (Lond. 1872); Thompson's *Malaysia and Indo-China* (Lond. 1875).

Cam'borne, a town of Cornwall, 4 miles W. of Redruth, and a station on the West Cornwall Railway, lies near the sea, in the midst of a copper, tin, and lead mining district. The town has some good houses, and a fine old granite church, recently restored. Richard Trevethick, the great engineer, was a native of C. Pop. (1871) 7757.

Cam'brai, a fortified city in the department of Nord, France, on the right bank of the Scheldt, 32 miles S.S.E. of Lille. It contains many picturesque old houses, with their gables to the street, and several handsome public buildings, among which are the Cathedral of St Sepulchre, with a fine steeple, the archbishop's palace, the theatre, and the Hôtel de Ville. In 1793 the Revolutionists disturbed the ashes of Fénelon, and converted his leaden coffin into bullets. A monument, by David, was erected in the cathedral to the memory of the illustrious archbishop in 1825. The situation of C. on the Scheldt, here navigable, and its connection with the Ouse and the Seine by the Canal of St Quentin, give it excellent facilities for trade. The manufactures consist of cambric (which derives its name from C.), lawn, lace, linen thread, cotton yarn, beer, brandy, soap, beetroot sugar, &c., and there is besides a trade in corn, wool, cattle, iron, hops, &c. Pop. (1872) 19,156. C., the ancient *Camaracum*, was a city of the Nervii, and, after the Roman conquest, one of the most important towns in Gaul. It has been the seat of a bishop since 390, and of an archbishop since 1559. Maximilian I. made himself Duke of C. The duchy next passed to Spain, and finally, in the reign of Louis XIV., to France. C. is historically celebrated for the *League of C.*, formed in 1508 by the Emperor of Germany and the Kings of France and Spain against Venice, and for other political treaties. In 1815 the city was taken by the British by escalade, and from that time till 1818 was one of the principal stations of the army of occupation.

Cam'bria, a Latinised form of the Celtic *Kymru*, meaning the country of the *Kymry* or Welsh. It is now used exclusively to denote the principality of Wales, but in the early part of the middle ages the Latin chroniclers also applied it to the northern Cymric kingdom of Strathclyde, or *Cumbria*. C. was first called *Walhas* ('the land of strangers') by the English intruders. It was the last refuge and stronghold of the Britons when driven from the lowland districts of the E. From the 7th or 8th c. the limits of C., N. and S., were the same as now, but it extended farther E., though it is impossible to define exactly where it touched upon the English Mercia (*Markland*, i.e., the land bordering on the Kymry).

Cam'brian Rocks, the name given to certain old rocks of the Palæozoic or most ancient period of geology, from the fact of their being specially developed in N. Wales and its borders. They exhibit a division into lower and upper strata, and are well developed both in Europe and N. America. In Britain the Lower Cambrians are well seen in the Longmynd Hills of Shropshire, where they attain a thickness of 25,000 feet, of coloured sandstones, grits, and shales, containing ripple-marks and rain-prints, but few fossils. The Upper Cambrians average from 2000 to 6000 feet in thickness, and consist of flagstones, slates, and shales. In these rocks, the Brachiopod (q. v.) shell *Lingula* attains a great development. The C. R. may thus be divided, in Britain at least :—*Lower C.*—(1) Longmynd Beds (25,000 feet); (2) Llanberis Slates (3000); (3) Harlech Grits (6000); (4) *Oldhamia*, Slates of Ireland. *Upper C.*—(5) *Lingula* Flags of Wales (6000); (6) Tremadoc Slates (2000); (7.) Skiddaw Slates (7000).

Cam'bric, a term applied generally to fine linen fabrics. Switzerland is famous for its cambrics, and in Scotland, an imitation C. is made of cotton, which is twisted hard to make it resemble linen. The term is derived from the name of the French city Cambrai, where C. was first manufactured.

Cam'bridge, the capital of Cambridgeshire, on both sides of the Cam, 51 miles N.N.E. of London, or 57½ by the Great Eastern Railway, and also connected with the Great Northern by a branch line from Hitchin. Several other branch lines connect it with all the important towns in the E. and centre of England. The streets, originally narrow, tortuous, and irregular, have been widened and improved, but the town possesses few features of beauty or interest. From the Gogmagog heights, however, in the neighbourhood, a fine prospect is obtained. Among the churches of C. may be noted that of St Sepulchre, built in imitation of the Holy Sepulchre at Jerusalem, and called from its shape 'the round church,' which was restored in 1843, and St Mary the Great (usually called the University Church, because the University sermons are preached here), with its massive tower crowned with turrets, which was restored in 1863. But the main architectural interest of C. is due to the buildings of the various colleges, which are situated in the W. part of the town, and on both sides of the Cam. C. is a place of great antiquity. It occupies or adjoins the site of the Roman *Camboricum* (itself probably an extension of a British town or place of some kind), and it appears in Domesday Book, and occasionally in the Latin Chroniclers, as *Grantabrigæ* or *Grantabrigæ*, from *Granta*, another name of the Cam. The town was twice burned by the Danes, in 871 and in 1010. William the Conqueror founded a castle here to overawe the English, who still held out in the neighbouring Fen-lands. The rise of the University in the 12th c. was marked by frequent feuds between the 'town' and 'gown,' and on one occasion (1381) the burgesses burnt the charters and records of the colleges, for which they were severely punished by the King. In the civil wars C. was garrisoned (1643) by Cromwell, and held for the Parliament. It has several endowed free schools, and a grammar-school founded in 1615 by Dr Perse of Caius College, a free library, a working-men's college and reading-room, and numerous charitable institutions. C. has no manufactures, but carries on a considerable trade with the port of Lynn. It returns two members to Parliament. Pop. (1871) of parliamentary borough, 33,996; of municipal borough, 30,078. C. is the birthplace of many famous men—e.g., Sir John Cheke, Jeremy Taylor, Richard Cumberland, and Orlando Gibbons.

Cambridge, a city of Massachusetts, United States, is separated from Boston by the Charles river, which is here about one mile in width. It is divided into Cambridge Port, East Cambridge, and Old Cambridge. In the latter is situated Harvard University, the oldest college in the United States, founded in 1638, and possessing (1875) 56 professors, and 1161 students, with departments in arts, medicine, law, divinity, and science, and about a million dollars in endowments. C. has a court-house and jail, some handsome churches, and many beautiful private mansions. The poet Longfellow and several other literary men reside in C., and in the vicinity is the beautiful cemetery of Mount Auburn. Pop. (1875) 39,634. C. was first settled in 1631.

Cam'bridgeshire, an English county in the basins of the Nen and Great Ouse; area, 820 sq. miles; pop. (1871) 186,906. The surface is level, thinly wooded, and marshy, the fens being

liable to floods. The pastures are excellent, and C. is famous for its butter and cream-cheese. The downs towards the S. support numerous sheep and cattle. The Fens, that part of the county N. of the Ouse belonging to the Bedford Level, are a maze of canals and ditches; the soil is a rich black mud, full of vegetable matter, and when properly treated produces heavy crops of oats, wheat, barley, beans, flax, and cole for sheep-feeding. The only manufactures of note are paper and coarse pottery. The principal rivers are the Ouse, which crosses the centre of the county, and is navigable; the Cam, a tributary of the Ouse, and navigable to Cambridge; and the Nene or Nen, also navigable. The chief towns beside the capital are Ely, Wisbeach, and Newmarket. There are numerous Roman remains; and several extensive earth-works, the most notable of which is the Devil's Ditch near Newmarket, are probably anterior to the Roman occupation. The county is also rich in ecclesiastical architecture, of which Ely Cathedral is perhaps the finest example. C. returns three members to Parliament.

Cambridge, University of, was from an early period (how early is not known) the residence of numerous students, who at first lived in hired apartments. About the middle of the 13th c. they began to congregate in hostels under a principal. This may be considered the beginning of the university system. The first charter, that of 15th Henry III. (1231), granted the privilege of appointing taxors to regulate the rent of lodgings hired by the students. It recognises a chancellor, masters, &c.; but the first college, Peter House, was not founded till 1257, and not endowed till 1282. The establishment of endowed colleges gradually extinguished the hostels, the last being Trinity Hostel, which survived till 1540. Edward III., in 1333, granted the university some important privileges; Pope Martin V., in 1430, vested in it exclusive ecclesiastical and spiritual jurisdiction over its scholars; and by the Act of 13th Elizabeth, c. 29, it was incorporated under the name of 'The Chancellor, Masters, and Scholars of the University of C.' At present it comprises seventeen colleges, viz. :—

	Founded.	Undergraduates in 1875.
St Peter's College, or Peter House	1257	37
Clare College	1326	85
Pembroke College	1347	78
Gonville and Caius College	1348	139
Trinity Hall	1350	140
Corpus Christi	1451	144
King's College	1441	28
Queen's College	1448	38
St Catherine's Hall	1473	57
Jesus College	1490	144
Christ's College	1505	108
St John's College	1511	381
Magdalene College	1519	50
Trinity College	1546	522
Emmanuel College	1584	63
Sydney Sussex College	1598	46
Downing College	1800	51

To these must be added 82 non-collegiate students.

Each college is bound by its own statutes, but is subject to the general statutes of the University, which were confirmed by an Order in Council, July 31, 1858. The senate, which is the governing body, assembles in the senate-house; the chancellor, high-steward, vice-chancellor, commissary, and assessor are invested with the executive authority, and the senate expresses itself on public occasions by the mouth of the public orator. The discipline and morals of the students are superintended by the proctors, and the public records are in charge of the registry. There are three terms—the Michaelmas term, extending from the 10th of October to the 16th of December; the Lent term, from 13th January to the Friday before Palm Sunday; and the Easter term, from the eleventh day after Easter Sunday to the Friday after the first Tuesday in July. Before proceeding to the examination for the B.A. degree, the candidate must have resided the major part of ten terms. A further residence of three years is necessary to procure the degree of M.A. The candidates aim either at honours, or merely at the 'pass' degree. These last, being much the more numerous, are known as the 'hoi polloi,' or 'the many.' Originally there were only two

Triposes for honours, the Mathematical and the Classical. The successful candidates under the first are arranged in the order of merit thus :—Wranglers, Senior Optimes, and Junior Optimes, the candidate who has distinguished himself most highly being called the Senior Wrangler. The Smith's prize, for excellence in mathematics, is occasionally wrested from the senior wrangler by some one of those near to him in the Tripos. In the Classical Tripos the names are arranged in the first, second, and third classes, the best man being known as First Classic. There are also a Moral Science Tripos, a Natural Science Tripos (examinations for honours in which were commenced in 1851), a Theological Tripos, and a Law and History Tripos. The students are classed as (1) *Fellow-Commoners* and *Noblemen*, who dine at the Fellows' table, have a somewhat different academical costume, and pay larger fees; (2) *Pensioners*, who pay for their own commons and chambers, and are not in any way assisted by the foundation; (3) *Sizar* (servitors), once bound to perform certain menial offices, from which they are now relieved, who are charged at a lower rate than the pensioners, and for whom there are liberal endowments in several of the colleges; and (4) *Scholars*, chosen by examination, who have free commons and chambers, and other privileges. The fellowships are numerous and valuable, varying from £100 to £300 in yearly value; while some of the senior fellowships exceed £500. The early conditions of tenure as to marriage and orders have been much modified and relaxed of late. The U. of C. returns two members to Parliament. Much improvement has lately been made on the university and college buildings. In 1861 Dr Whewell erected a hostel for the students of Trinity at a cost of £10,000, a wing was added to the university library in 1865, and St John's, St Peter's, Queen's, and Caius, have been partly rebuilt or restored. See Mullinger, *The University of C. from the Earliest Times to the Royal Injunctions of 1535* (Camb. 1873), and the *C. Calendar*.

Cambuslang', a town of Lanarkshire, Scotland, in a parish of the same name, on the Clyde, 3 miles S.E. of Glasgow, on the Clydesdale line of the Caledonian Railway. Pop. (1861) 749; (1871) 2104, mostly engaged in coal-mining. Here in 1741 Whitefield (q. v.), the great Methodist preacher, produced a profound impression, which led to one of the most extraordinary religious 'revivals' that ever took place. In many cases 'conversion' was followed by violent physical convulsions.

Cambyses (Pers. *Kabujiya*), King of the Medes and Persians, was a son of Cyrus the Great, whom he succeeded, B.C. 530. In 525 he invaded Egypt, of which a single victory at Pelusium over King Psammetichus made him absolute master. He afterwards warred unsuccessfully against the Ethiopians, the Cathaginians, and the Ammonians. Irritated by this, his constitutional tendency to insanity was aggravated, and he ruled Egypt with excessive rigour; but the accounts of his cruelties and excesses, coming from Egyptian priests, are probably somewhat highly coloured. Whilst marching through Syria to punish a pretender to his throne, he died of an accidental wound in the thigh, B.C. 521.

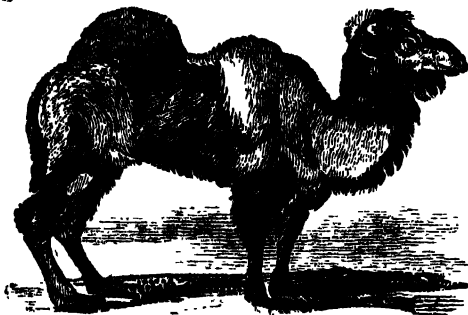
Camden, a city and port of entry in New Jersey, U.S., on the left bank of the Delaware river, opposite to Philadelphia, with which it is connected by five ferries. It is the terminus of the Cape May, Melville, and West Jersey Railways, has extensive ironworks at Kaighn's Point, several shipyards and foundries, and manufactures of machinery. Pop. (1870) 20,045.

Camden, Charles Pratt, Earl of, a famous English judge, was the son of Chief-Justice Sir John Pratt, and born in 1714. He studied at Eton, King's College, Cambridge, and Lincoln's Inn, being called to the bar in 1738, entering Parliament in 1754 as member for Downton. C. filled in succession the offices of Recorder of Bath, Attorney-General, Chief Justice of the Common Pleas, Lord Chancellor, and President of Council, holding the last under both Rockingham and Pitt. He made himself extremely popular by espousing the side of the people as against that of the court in the case of Wilkes, and by his action in opposing the policy of Lord North in regard to America. C. was raised to the peerage as Baron C. in 1765, and in 1786 was created Earl C. and Viscount Bayham. He died April 13, 1794.—His eldest son, **John Jeffreys Pratt**, born 1759, filled numerous important offices during a long and honourable political life, including those of Lord-Lieutenant of Ireland, Colonial Secre-

tary, and President of the Council, and in 1812 he was made a marquis. He died 8th October 1840.

Camden, William, an illustrious English antiquary and historian, was born in London, 2d May 1551. Educated at Christ's Hospital, St Paul's School, and Oxford University, he became, in 1575, second master of Westminster School; and it was while holding this post that he published in 1586 his celebrated work *Britannia*, written in Latin, which gives an account of the British Isles from the earliest ages. The work has been added to by subsequent writers, and has passed through a number of editions. It has all the stately pomp and patriotism of the English Elizabethans, and is a noble specimen of learning devoted to a national purpose. The first English version of the *Britannia* was published in 1610; the next, by Bishop Gibson (with additions), appeared in 1694, and has been frequently reprinted; a third by Gough, in 3 vols. folio, is of date 1789. C. became head-master of Westminster School in 1593, and published a *Greek Grammar* for his boys in 1597, and in the same year became Clarencieux King-at-Arms. He died at Chislehurst, in Kent, 9th November 1623. A society, known as the C. Society, founded after his death, still flourishes, its object being to publish early historical and literary remains. A Professorship of History was also endowed by C. in the University of Oxford. He was the author of several works besides *Britannia*, among the chief being *Annales Rerum Anglicarum et Hibernicarum regnante Elizabetha* (1615; Eng. transl. 1630), *A Narrative of the Gunpowder Plot* (1607), and *An Account of the Monuments and Inscriptions in Westminster Abbey* (1600).

Cam'el ('the bearer,' from the Arab. *chamal*, 'to bear'), a genus of *Mammalia* included in the *Ungulate* or *Hoofed* order of that class, and in the *Ruminant* section of the order. The camels are *Artiodactylate*, or 'even-toed' Ungulates, in that they possess but two toes, covered by imperfect hoofs, or nails. The feet are elongated, and their soles are covered by a horny pad of integument joining the two toes, and forming a flat sole on which these animals walk. The hinder or



Camel.

rudimentary toes seen in most other ruminants are wanting in the camels, which also are devoid of horns, and the nostrils can be closed at will. In their dentition the camels also present certain differences from that of other ruminantia. The upper incisors resemble the canine teeth, and upper canines are present in addition—the typical ruminants wanting both upper incisors and canines. The family *Camelidae*, or camels, also includes the genus *Anchenia* or Llamas (q. v.), which are distinguished from the camels by their smaller size, by their habitat (S. America), by the separation of the two toes, by the want of humps, by the cleft mobile upper lip, and by the possession of two teats only.

Of the genus *Camelus* or true camels, which inhabit Asia and Africa, only two distinct species are known. These are the Arabian camel or dromedary (*Camelus Dromedarius*), which possesses but one hump, and the Bactrian C. (*C. Bactrianus*), which possesses two humps. These humps are simply collections of fat, which during long hunger or privation disappear by absorption, and thus constitute sources of food supply to these animals, which, from their powers of traversing long arid tracts of sand and desert without adequate food and rest, are extensively employed both as beasts of burden and for riding, chiefly by the Arabs. A good riding C. has been known to travel 115 miles

in eleven hours. The paunch or first stomach in the camels possesses large cells, in which water can be stored and carried for use on the long journeys undertaken by these animals. The chest, shoulders, and knees also possess callous pads, on which these animals rest when they lie down.

The Arabian C. inhabits N. Africa and the S.W. parts of Asia. It has been introduced into Europe, but rarely breeds in the latter continent. The Bactrian C., which is generally of larger size than the Arabian species, inhabits Central Asia, Persia, and the tract between the Caspian and Black Seas. This species is often interbred with the Arabian C., and appears of hardier constitution than the latter form. It can carry a load of from 1000 to 1500 lbs. weight. These animals produce usually only a single young at a birth, and the female goes about twelve months with the young. The hair is long and soft, and is woven into a strong cloth fabric. The milk is also used by the Arabs.

The fossil remains of two extinct species of camels occur in the tertiary deposits of the Siwalik Hills of Hindustan.

Cam'elford, originally *Gafulford*, 'the tribute ford' (the *Camelot* of Arthurian romance), an old town of Cornwall, on the Camel, 16 miles W. of Launceston, the scene of the legendary battle between King Arthur and his nephew Mordred. The ruined Tintagel, Arthur's Castle, stands 4 miles to the N.W., on a precipice overhanging the sea. Here the men of Devon fought the Britons of Cornwall in 823.

Cameli'na, a genus of plants belonging to the natural order *Crucifera*, containing two or three European and N. American species. *C. sativa*, the 'Gold of Pleasure,' is the most interesting species. It is a native of Central and Southern Europe and temperate Russian Asia, but is only a questionable native of Britain. It is cultivated on the Continent for the sake of its seeds, which are a valuable food for cattle, for the oil which they contain, and on account of the fibre which is obtained from its stems. The seeds are sometimes erroneously called 'dodder seeds.' The origin of the English name is unknown.

Camellia, a genus of plants of the natural order *Ternstroëmiaceæ* (q. v.), nearly related to the Tea genus (*Thea*), the difference being only in the number of the floral organs and the position of the flowers. C. is found in China, Japan, Cochinchina, the Himalayas, Java, Borneo, and Sumatra. *C. japonica* of our conservatories is the best-known species. It has been cultivated in China and Japan from the earliest times. In 1739 it was introduced into Britain. Various others have since then been imported and cultivated. *C. reiculata* is a native of Hong-Kong. *C. Sasanqua* is found in Japan and China. From the crushed seeds an oil is obtained in China, and is used for various domestic purposes. A decoction of the leaves is used by the Japanese women to wash the hair, and the dried leaves are mixed with those of the tea-plant in order to impart to the infusion their pleasant odour. The seeds of *C. drupifera* also yield an oil used in medicine in Hong-Kong. It is also found in the Eastern Himalayas. *C. lanceolata* is a native of Sumatra and Borneo, and *C. quinosaura* of Java. The care which has been bestowed on the cultivation of these plants is owing not only to the beauty of their flowers, but also on account of their value from flowering in autumn, winter, and spring. Loose black mould, mixed with a little sand and peat, is about the best soil to grow them in. Free access of air and liberal watering are necessary to their growth; they do not require a high temperature, but cannot bear frost, and cultivators differ as to whether they should be exposed to the action of sunshine or not. C. is named in honour of Kamel, or Camellus, as his name was Latinised, a learned Jesuit traveller in the East.

Camelopardalis. See GIRAFFE.

Camel's Thorn (*Alhagi*), a genus of plants belonging to the natural order *Leguminosæ* (q. v.), sub-order *Papilionaceæ*, the species of which are mostly herbaceous, or half-shrubby plants. *A. camelorum* yields a kind of Manna (q. v.), in the form of a honey-like exudation from the leaves. *A. Nepalensis* yields a similar exudation.

Cam'eo, a term applied to minute relief sculpture on gems, shells, &c., as contrasted with an *intaglio*, which is sunk into the gem. Much doubt exists as to the derivation of the term, and many fanciful explanations have been offered to account for it.

Most probably it is derived from the Arabic *chemia*, 'a charm.' So far back as the year 1343, we find the great C. of Ste. Chapelle in Paris spoken of as *Le Camahieu*. The glyptic art, or gem-cutting, claims a high antiquity; it was practised by the Egyptians, and was carried to its highest perfection by the Greeks and Romans. Camei, which were used for ornamenting golden cups and pateræ, or as personal ornaments, were rarely produced as compared with intagli, which served as seals; therefore antique camei are much more valuable at the present time than intagli. The sardonyx, a gem formed of black, or dark brown, and white layers, alternating with a layer of carnelian, was most esteemed by ancient artists for camei, as scope was afforded for treating distinct parts or different elevations of a design in various colours. For example, in engraving a head upon a three-banded onyx, the undermost layer served as a background, and enhanced the relief of the face cut in the middle band, while the uppermost was taken advantage of to represent the hair, wreath, drapery, &c. The onyx and various other chalcedony stones of single hue were also employed by the ancients in gem-engraving, and frequently bands of different colours were artificially produced. (See BURN'T STONES.) A vast number of antique intagli and camei, many of exquisite beauty in minuteness and execution, are scattered through national museums and private collections in Europe. The finest specimen of the glyptic art extant, a C. known as the 'Gemma Augustæ,' is now in the Imperial collection at Vienna. In England, the Marlborough, now (1875) in the possession of Mr Bromilow, Battlesden Park, Bedfordshire, the Bessborough, Devonshire, and Carlisle collections are rich in antique gems. The first-named includes the most famous C. in this country, representing Cupid and Psychè, the work of a Macedonian artist. During the dark ages which followed the decline of the Roman Empire, the glyptic art was lost; it was, however, revived in Italy during the Renaissance period of the 15th and 16th centuries, and through many vicissitudes it has survived to the present day, being practised to a slight extent at Paris and in Italy.

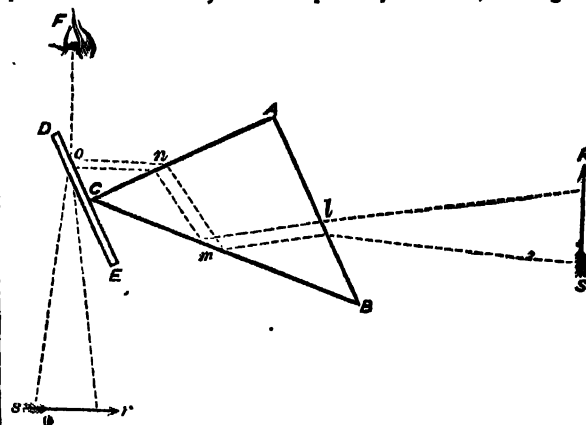
Shell Cameos.—The scarcity of gems suitable for cameos led Italian engravers early in this century to resort to shells that present layers of different colours, for the continuance of their art, and now the shell-C. industry is extensively practised at Paris as well as at Rome. The shells best adapted for C.-engraving are the 'Bull's Mouth' (*Cassis rufa*) and the 'Black Helmet' (*Cassis Madagascariensis*). These possess respectively a 'sardonyx' and 'onyx' inner layer. The 'Horned Helmet' (*Cassis cornuta*), with a yellow ground, and the 'Queen's (onch)' (*Strombus gigas*), with a pink ground, are also employed.

Lava Cameos, popularly so called, are abundantly produced in the Neapolitan States from an indurated clay found in volcanic districts. Shell and lava cameos are chiefly mounted as brooches and other personal ornaments.

The pieces of shell and stone (soft) for cameos are shaped to the required form on the grindstone, and are cemented to a stick which serves as a handle for the artist to grasp, while he first traces the design in pencil, then scratches the outline with a sharp point, next develops the figure with very delicate tools of steel wire, flattened and hardened at the end with a carefully sharpened edge, finally polishing with putty powder.

Camera Lucida (Ital. 'light chamber'), an optical instrument which enables any person to sketch an object or landscape with ease and accuracy. There are many forms of this instrument, based upon the original C. L. invented by Dr Wollaston, which consists of a small four-sided glass prism with one right angle, opposite which is an obtuse angle of 135° , and other two angles of $67\frac{1}{2}^\circ$ each. It is mounted for use with one of the sides of the right angle turned to, and perpendicular to, the object to be delineated, the other side forming the upper horizontal surface over which is the eye of the observer. Rays from the object falling upon the perpendicular face enter the prism, and are reflected twice in succession from the two sides forming the obtuse angle, and emerge from the prism perpendicularly to the horizontal surface, entering the eye which perceives the image of the object upon a sheet of paper directly beneath; the outline may then be traced with a pencil. Amici's C. L. has the merit of not straining the eye to see the image and the pencil at the same time so much as Wollaston's. Its form and action are shown in the annexed figure. *ABC* is a triangular glass

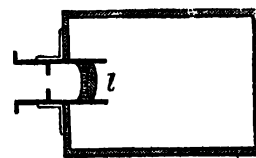
prism, right-angled at *A*; *DE* is an inclined glass plate; *lmno* show the course of the rays from the object *RS* to the glass plate from which they are then partially reflected, forming an



Camera Lucida.

image of *RS* which is seen by the eye *F* in the direction of *r s*.

Camera Obscura (Ital. 'dark chamber'), an optical apparatus by which images of external objects are projected on a prepared surface, serving a variety of useful purposes, especially in the art of photography. It was invented in the second half of the 16th c. by Giambattista Porta, of Padua, who first described the optical phenomenon on which the instrument is based. If all light be excluded from a room, except that which is admitted through a small hole bored in the window shutter, an inverted image of the objects outside, directly facing the window, is thrown, in the natural forms and colours, upon a sheet of white paper properly adjusted to receive the light. By the introduction of a convex lens into the aperture, and placing the paper at a distance from the lens equal to its focal length, the image is rendered sharper and more distinct. It is obvious that by means of an instrument embodying the above principle drawings of natural objects may be made with perfect accuracy by mere tracing. The C. O. assumes a great variety of forms, according to the circumstances under which it is applied; its most important and extensive application, however, is in the photographic act. The photographic camera is essentially a very simple instrument; the annexed figure shows a sectional view of one of the simplest form.



Camera Obscura.

It consists of a wooden box having a sliding brass tube in front, containing a meniscus lens, *l*, before which is a diaphragm with a small aperture. The back of the box is provided with a vertical sliding-frame, fitted with a piece of ground-glass, called a *focusing screen*, which can be replaced by another frame of similar dimensions called the *camera slide*, carrying the sensitive plate or paper, shielded from diffused light by a movable shutter. When the camera is required for use, it is brought into focus by gently shifting the lens tube till a distinct picture is obtained on the ground-glass; the camera slide is then inserted in place of the focusing screen. The sensitive surface is meanwhile screened by the shutter in front of it, which, when all is ready, is raised, and after the exposure of the sensitive plate or paper for a few seconds, the shutter is instantly lowered, and the camera slide removed in order that the picture may be developed and fixed. Great perfection has been attained of late years in the construction of the C. O.; portable instruments, carrying all the mechanical and chemical requisites for indoor or field operations, as well as a 'universal' camera, adapted either for portraits, landscapes, or copying, may now be obtained.

Camera'rius, Joachim, originally *Liebhart*, a celebrated German scholar, was born at Bamberg, 12th April 1500. He reorganised the Universities of Leipsic and Tübingen, was the friend of Melancthon, and assisted Luther in the work of the

Reformation. He was a deputy at the Diet of Augsburg. C. died at Leipsic, 17th April 1574. His *Life of Melancthon* (1566; new ed. 1777), followed by a collection of his letters in 1569, are valuable contributions to the history of the Reformation. His *Commentarii Lingua Græca et Latina* (1551) are still esteemed, and his posthumous *Epistola Familiares* reflect much light on contemporary history. The publication of his commentary on Cicero's *Questiones Tusculanae* (1525) brought him into correspondence with Erasmus. The distinguished botanist of the same name (1534-98) was the son of C.

Camerino (anc. *Camerinum*), a town in the province of Macerata, Central Italy, 29 miles W. of Perugia, on the Potenza; is the seat of an archbishop (1787), and has a small university, founded in 1727, and attended by some fifty students. The principal buildings are a cathedral and the archbishop's palace. There is some trade in silk, which the district produces largely. Pop. 6000.

Cameron Highlanders, the 79th Regiment of British infantry, named after Sir Alan Cameron of Erroch, who raised the corps in 1793. The men wear the Highland garb, and the regiment holds most distinguished honours, won in the Peninsula and at Waterloo, and in all the great conflicts in which the British army has been since engaged.

Cameron, John, a scholar of high repute, and a theologian of advanced opinions for his time, was born in Glasgow about 1580, and was educated at its university, in which he held the post of Greek reader in the twentieth year of his age. Going to France in 1600, he was appointed Professor of Philosophy in the University of Sedan. He was afterwards a Protestant pastor at Bordeaux, then Professor of Divinity in the University of Saumur till 1620. Returning to Britain, C. was made Professor of Divinity in the University of Glasgow, but went back to Saumur in less than a year; thence to Montauban, where he filled the chair of Divinity till 1625, when he was assassinated in the street by a zealot who could not endure his political views.

Cameron, Richard, a Scotch Presbyterian minister, from whom the Cameronians received their name, was born at Falkland in the 17th c. When licensed to preach, he made himself so obnoxious to the Government by his opposition to Episcopacy, and his bold assertion of the spiritual independence of the Church, that he was obliged to leave the country and seek a refuge in Holland. Returning to Scotland in 1680, he and about twenty companions entered the town of Sanquhar, and proclaimed that they renounced their allegiance to the King. A price having been set on their heads (£5000 on C.'s and £3000 on those of the others), they fled to the hills, but in July of the same year, at Aird's Moss, they were surprised by a troop of dragoons under Bruce of Earlsall, overpowered, and several of them killed, C. being among the number. See Bell's *Life of Richard C.*, and Walker's *Biographia Presbyteriana*.

Cameronian Regiment, the 26th Regiment of British infantry, raised in Scotland, and mainly recruited from among the West Country people, mostly Hillmen or Cameronians (q. v.), who flocked to Edinburgh during the Revolution of 1688. These zealous sectaries acted under the belief, fostered by the Convention which sat at Edinburgh, that this regiment was to assist in securing the establishment and stability of a government which would administer the affairs of Scotland according to the letter of the Covenants. After distinguishing themselves greatly in the Revolution struggle, the men were sent to the Continent to engage in the wars which William III. had on hand. This was unquestionably a deviation from the purpose for which they were embodied, but they distinguished themselves as greatly as if they had been volunteers, and, to this day, the 26th of the line maintains untarnished its ancient honours.

Cameronians, *The*, were a party of the Covenanters in Scotland, formed in 1680 under the leadership of Richard Cameron and Donald Cargill. In a statement of their principles they disowned monarchy, and expressed their intention to set up another form of government according to the Word of God; and in the Sanquhar Proclamation (see CAMERON, R.) they declared war against the King and all who adhered to him. Cameron and Cargill (who was executed 1681) were succeeded as heads of the sect by James Renwick (executed 1688), and then by Alexander Shields. At the Revolution the three ministers they

had were received into the Established Church, but because the General Assembly did not expressly renew the Solemn League and Covenant the C. would not follow them, and they remained for some years without any minister. The first they got were John Macmillan and John Hepburn, both of whom had been expelled from the Established Church for preaching against the oath of allegiance, and John M'Neill, a licentiate of the Established Church. In 1712 they performed the ceremony of renewing the Covenants. In 1743 their two ministers, Macmillan and Thomas Nairn, constituted a presbytery, and organised a sect, properly called since that time the Reformed Presbyterians, who still deplore the constitution of Church and State established in both kingdoms at the Revolution and the Union, refusing to take the oath of allegiance or exercise the franchise. In 1860 some of the kirk-sessions attempted to prevent the members becoming volunteers on account of the oath of allegiance required to be taken, and the question came before the Synod, which decided (1863) that excommunication for taking the oath should cease. In consequence of this decision there was a small secession; and there now exist two sects bearing the name of Reformed Presbyterians, the one numbering about 45 congregations, the other about 11. The former has just resolved (1875) on union with the Free Church. See Walker's *Biogr. Presbyt.*, Wodrow's *History of the Sufferings*, &c., and Shield's *Hind let Loose*.

Cameroons, the highest mountain range on the whole W. coast of Africa, is situated in the N.W. of Biafra, and culminates in a peak, about 11,000 feet high. The range is of volcanic formation, and its sides are clad with palms, African oaks, and acacias. It was first visited by Captain Burton in 1861. The river C. rises in the mountains of the same name, and enters the Bight of Biafra, in Upper Guinea, by an estuary 20 miles broad. It has only been partly explored, but at a distance of 40 miles from the sea it has a breadth of a quarter of a mile. It flows through an inhabited region.

Camillus Marcus Furius, a distinguished Roman patrician, was appointed dictator, B.C. 396, to crush the revolt of the Veientes. Having captured Veii, he entered Rome in triumph; but being accused of having made an unfair division of the spoils, he went into exile, and was heavily fined. Soon after, the Gauls, under Brennus, having wasted Etruria, and defeated the Romans with great slaughter, advanced against their city and reduced it to ashes, with the exception of the Capitol, which was bravely defended by Manlius. C. was now appointed dictator a second time (390), and recalled from his self-chosen exile. According to the favourite legend, he surprised and completely routed, or, according to another account, bought off the invaders, rebuilt the city, and in a third dictatorship defeated the Volsci and Æqui. In 386, after declining a new dictatorship, he defeated the Antiates and Etruscans. In 368, when the contest between the patricians and plebeians culminated, the senate appointed C. dictator for the fourth time, but he soon resigned. In the following year, dictator now for the fifth time, he defeated the Gauls near Alba, and was rewarded with a triumph. In 365 he died of the plague. See the Roman Histories of Niebuhr and Mommsen.

Camisards. See CEVENNES.

Camlet, or **Camelot**, originally in the East a cloth made of camel's hair, but now of the hair of the Angora Goat (q. v.). British camlets are either of wool, or of wool mixed with cotton or linen, and spun hard.

Camoens, Luis de, the most renowned of Portuguese poets, was born of noble parents, probably in 1525, and studied at the University of Coimbra, where he met, but did not associate with, Ferreira and others of the classical school. After living at Lisbon and Santarem, he served in the fleet during the African war (in which he lost an eye), sailed to Goa in 1553, and obtained some military employment from the Viceroy of India, but was ultimately banished to a small civil port at Macao, where he wrote his great poem the *Lusiad*. In 1569 he returned penniless to Lisbon, where King Sebastiao treated him in the most niggardly manner, published the *Lusiad* in 1572, and lived in the greatest misery till 1579, when he died in a public hospital. C. therefore did not survive the political independence of the country whose gallant history in the Old and New Worlds he has told in his great epic, *Os Lusíadas*, or *The Portuguese (Lusitanians)*. This work (written in Ariosto's heroic rhymed

iambics, and published twenty-one years before Tasso's *Gierusalemme Liberata* consists of 1102 octavo-stanzas, which recount particularly the voyage of Vasco de Gama, the Portuguese successes in the Indian Seas, the foundation of Goa, the double conquest of Ormuz, and the ruin of Calicut. Bacchus is supposed to thwart Venus to aid the Portuguese, and strangely enough the divine persons of the Christian theology also assist. The European history of the Portuguese is given in the form of a narrative by Gama before the King of Melinda, just as the story of Troy is told to Dido by Æneas. Interspersed through the main poem we find legends like that of the twelve knights of England and that of the marriage of Gama with Thetis. Rich imagination, melodious verse, sustained dignity, and a fervent patriotism, have made C., 'the only poet of Portugal,' a European classic. Among his minor pieces are many beautiful sonnets, *cançãos* or *canzoni*, in imitation of Petrarch, and lyrical pieces, and a short satire, *Disparates na India*, on the misgovernment of India. He also left some national pieces in a trochaic measure, known as *redondilhas*. In 1817 a splendid folio edition of the *Lusiad* was published at Paris at the expense of De Souza Botelho, and has been twice reprinted. The *Lusiad* has been translated into almost all European tongues. There is considerable spirit, though not much fidelity, in Mickle's English version (1775), while that of Aubertin (1878) is the most scholarly. See Adamson's *Memoirs of the Life and Writings of Luis de C.* (2 vols. 1820); and Lamarre, *C. et les Lusitades* (Par. 1878).

Cam'omile, or **Chamomile** (*Anthemis*), a genus of plants of the natural order *Compositæ*, sub-order *Corymbifera*, several species of which are found in Britain, and some of which are employed in medicine. Among these are the common C. (*A. nobilis*), which is internal, bitter, and aromatic. Its properties are owing to the presence of the oil of C. which abounds in all parts of the plant. An infusion of the dried flowers is employed as an alterative and anti-spasmodic, and as a stimulant of the abdominal nerves. It is also applied to the skin as an anodyne. *Matricaria Chamomilla*, a plant belonging to the same order and possessing similar properties, is often called the 'wild C.' C. is also used (illegally) to supply the place of hops in giving the bitter quality to beer. The other three British species of *Anthemis* (*A. Cotula*, *A. arvensis*, and *A. tinctoria*) are mere weeds. So acrid is *A. Cotula* ('stinking Mayweed') that it will blister the fingers. *A. tinctoria*, as the name signifies, yields a yellow dye. It is a Scottish superstition that toads suck their venom (*asie*) from the C., and also that to lie upon a bed of C. is a sure cure for a headache. It is believed that the more it is trampled upon the better it will grow, a notion often brought into requisition by the old divines. (Hardy, in Johnston's *Botany of the Eastern Borders*, p. 104.)

Camorra's (Ital. *camorro*, 'a peasant'), a secret brotherhood, the members of which were called *Camorristi*, which at one time infested the kingdom of Naples. They plundered the middle and lower classes in every conceivable way, bought and sold almost on their own terms, smuggled goods, and were always ready for any deed of violence or murder. Tolerated by Ferdinand II., they were severely repressed by Francis II., and in consequence co-operated with the Garibaldians for the expulsion of the Bourbons. The government of King Victor Emmanuel has persistently tried to put down the *Camorristi*, after the failure of the attempt to employ its members in the police service. Brigandage in S. Italy is now the outlet sought for their energies by such of the brotherhood as remain loyal to their mischievous traditions. See Monnier, *La C.*, *Notizie Storiche* (Flor. 1863).

Camouflet, a French word (origin unknown) meaning the smoke of a lighted paper, is applied in military pyrotechny to a strong and offensively smelling composition, put up in paper cases, and used by sappers and miners at siege works to blow into the faces of enemies they may encounter during their operations.

Camp (Lat. *campus*), originally the ground occupied by an army at rest. Its signification was soon extended so as to include the tents and other structures for troops. The fortified C. (*castra*) of the Romans was a work of great arrangement and skill. In most cases it was square in form, and surrounded by a fosse, with a stake-fenced embankment inside of it. On each side was a gate, and the interior was divided into streets, the broadest of which, 100 feet wide, ran between the side gates.

The front part of the C. was again equally divided by another street 50 feet wide, parallel to the last, and was intersected by five streets of the same width crossing the intervening street at right angles. This part of the C. was occupied by the two legions that formed the consular army, flanked on each side by the right and left wings, composed of allies. In the back part, a little way behind the centre of the principal street, was the *Prætorium*, or general's tent, which was usually placed on an elevated spot to command a view of the entire camp. On each side, and in rear of the prætorium, were the tents and quarters of the troops. The whole interior was surrounded by a vacant space 200 feet wide, between the ramparts and the tents, to facilitate the movements of the troops, and to afford protection from fire and missiles. In choosing ground for a C., it was of the first importance to obtain a site in a favourable position, that could not be overlooked, and where water was easily accessible. Many of the stationary camps (*castra stativa*) of the Romans in this country eventually became towns, hence the common termination *cester* or *chester* in names of places. Ancient British camps seem to have been generally circular in form and very rude in construction. For an account of modern camps, see **ENCAMPMENT**.

Campagna's, a town in the province of Salerno, S. Italy, lies in a mountain region 20 miles E. of Salerno, is a bishop's see, and has a cathedral and some monasteries. Pop. 8192.

Campagna di Roma, an unhealthy and almost uninhabited region of Italy occupying the greater part of the province of Latium, and surrounding the city of Rome. It extends from Ronciglione to Terracina, a distance of 90 miles, and stretches from the Mediterranean inland for some 40 miles. Its surface is extremely flat, and mainly of volcanic formation, affording in some parts excellent pasture. The most healthy places are Tivoli, the Papal palace Sastel-Sandolfo, Ariccia, and Genzano. Besides extinct craters where solfataras abound, the pestilent *aria cattiva* is most prevalent and deadly. Various reasons have been assigned for the mysterious blight which has fallen on this district, but they are all alike vague and unsatisfactory. It is supposed to have been healthy and pleasant in early times from the fact that Domitian and Hadrian built their magnificent villas here; but Livy states that even when cultivated it was malarious. Several attempts have been made to improve it, and the Italian Government allowed Garibaldi to attempt the task in 1875, but his scheme has been rejected.

Campaign, a series of military operations, forming a distinct stage in a war, and undertaken for a definite object. When armies used to go into quarters during the winter, a C. meant only the operations during the summer months, when soldiers were in the field (Lat. *campus*); but now that the field is kept during the winter also, the word has acquired the wider application stated above.

Campan, Madame Jeanne Louise Henriette, née Genest, was born in Paris, October 6, 1752. At the age of fifteen she was reader to the daughters of Louis XV., and afterwards in the household of Marie Antoinette, whom she begged in vain to be allowed to accompany to the Temple. Becoming an object of suspicion to Robespierre, she quitted Paris, and found an asylum at Combertin. Destitution led her to establish a boarding-school at St Germain-en-Laye, where she had for a pupil Hortense Beauharnais. After the battle of Austerlitz, Napoleon appointed her superintendent of the Imperial Institute of Ecrouen, established for the education of daughters of the officers of the Legion of Honour. She died May 16, 1822, at Mantes. Her *Mémoires sur la Vie Privée de Marie Antoinette* (3 vols. Par. 1823), and *Correspondance Inédite avec la Reine Hortense*, besides bearing on events and persons of exceptional interest, are written in a clear and natural style.

Campa'na, La, a town of Spain, province of Seville, Andalusia, 30 miles E.N.E. of Seville. The chief industries are weaving and brick-making. Pop. 5380.

Campana'rio, a town of Spain, province of Badajoz, 69 miles E.S.E. of Badajoz. It has some manufacture of liuens and ropes, and some trade in corn and wine. Pop. 5400.

Campanell's, Tomma'so, a Dominican monk of a liberal and philosophical mind, was born at Stilo, in Calabria, September 5, 1568. A follower of Galileo, and a partisan of Descartes'

new philosophy, he incurred the hatred of the scholastics and clergy, and was forced to leave Naples, where he had publicly defended his new theories. Accused and convicted of conspiring against the welfare of Naples, he was confined for twenty-seven years in a Neapolitan dungeon, during which period he suffered torture seven times. Though released by Pope Urban VIII in 1626, the hatred of his persecutors still showed itself; and accordingly he soon repaired to Paris, where he died in 1639. Most of his works were written, and some published, during his imprisonment—e.g., the *Apologia pro Galileo* (1622), *Realis Philosophia Epilogistica Partes Quatuor*, &c. (1623), *Atheismus Triumphatus* (1631), *Philosophia Rationalis Partes Quinque*, &c. (1638), *De Monarchia Hispanica Discursus* (1640), &c. See Baldacchini's *Vita e Filosofia di Tommaso C.* (Naples, 1840), and Symonds' *Sonnets of Michael Angelo and Campanella* (1878).

Campania, a central province of Italy, was bounded on the N. by Latium, on the E. by Samnium, on the S. by Lucania, and on the W. by the Tyrrhenian Sea. It consisted of a great plain (hence its name) stretching from the Apennines to the sea, broken only by a group of volcanic hills, of which Mons Gaurus is the chief, and by the isolated cone of Mons Vesuvius. C. was greatly celebrated for its beautiful scenery and soft climate, and produced wine (such as the Massic, Falernian, &c.), oil, corn, and fruit of rich quality, and in great abundance. The original inhabitants were of the Oscan branch of the Italian family, and after repeated conquests (in historical times, by the Greeks, the Etruscans, the Samnites, and the Romans successively), the people remained essentially Oscan. The chief cities were the capital, Capua (on the Appian Way), Baiæ, Naples, Herculaneum, Pompeii, Nola, Cumæ, &c. The modern name of C. is *Caserta*.

Campanile (Ital. from Low Latin *campana*, 'a bell'), in architecture, a term borrowed from Italy, where it is used strictly to signify a bell-tower belonging to, but detached from, a church. It corresponds to the Gothic belfry attached to both civic and ecclesiastical buildings, and to the steeple of the churches in Northern Europe; but besides usually standing apart from its church, the true C. is distinguished from the bell-tower of the Teutons in being of equal dimensions from base to coping, unsupported by buttresses, and terminated without a spire. The C. is to be seen in most of the famous Italian cities, and that of St Mark has been made familiar to British readers from Mr Ruskin's description in his *Stones of Venice*. Among the most remarkable of the Italian campaniles are those of Cremona, which rises to the extraordinary height of 396 feet; of Florence, designed by Giotto, and 268 feet high; of Bologna, which is 8 feet 8 inches out of the perpendicular. The C., or leaning-tower, of Pisa is 151 feet in height, and 12 feet 9 inches out of the perpendicular. Of this peculiar and interesting structure the columns and capitals are in black marble, and the upper tier is recessed back—a characteristic detail which has recently been repeated in bell-towers erected at Streatham and Wilton.

Campanula (Lat. 'little bell'), the bell-flower, a genus of plants belonging to the natural order *Campanulaceæ* (q. v.).



Campanula Medium.

There are about 200 species, chiefly natives of the N. of Asia, Europe, and N. America, very few being found in the tropics. The flowers of all of them are graceful and attractive, and many are very beautiful. *C. rapunculoides*, or rampion, *C. persicifolia*, and *C. rapunculoides*, are cultivated for the sake of their roots, which are boiled and eaten with sauce, vinegar, or pepper. *C. glauca* is reputed a tonic, and several are said to be antisyphilitic, but the virtues, real or supposed, of all of them are of very little importance. *C. trachelium* was at one time used in affections of the throat, hence its name ('throatwort') and its specific name (Gr. *trachelos*, 'the neck'), but its 'virtues' are only imaginary. *C. pyramidalis*, *C. glomerata*, *C. latifolia*, &c.—in all about seventy or

eighty species—are among those cultivated. The 'Canterbury Bell' (*C. medium*) is probably the best known. Among the nine wild British species, *C. rotundifolia* is the most celebrated. It is the 'Ladies' Thimbles' or 'Blue Bells' of Scotland, and under the latter name it has been sung by many poets. The name is sometimes, though improperly, given to *Scilla mutans* (the wild hyacinth).

Campanulaceæ, a natural order of plants belonging to the division *Dicotyledons*, sub-division *Calycifloræ*, chiefly natives of the temperate regions of the northern hemisphere, a few, however, being found at the Cape of Good Hope. Very few are tropical. There are about 550 species, distributed over twenty-nine genera—such as *Fusione*, *Campanula*, *Adenophora*, *Specularia*, &c. The milky juice of some of them is somewhat acrid, but the roots of several species of *Campanula* (q. v.), those of *Cyphoglandulifera* of Abyssinia, *C. digitata* of the Cape of Good Hope, and some species of *Specularia*, are used in salads, and the fruit of *Canarina campanula* of the Canary Islands is eaten.

Cam'pbell, Family of. See ARGYLE.

Campbell, Sir Colin, Lord Clyde, one of the bravest soldiers and best generals that Britain has produced, was born in Glasgow, 20th October 1792. His father was a cabinetmaker named John MacIver. In 1808 he entered the army as an ensign, taking, to please an uncle, the name of C. He distinguished himself greatly in the wars in the Peninsula, the United States, China, and India, and particularly at the battle of Chillianwallah. On the outbreak of the Crimean war in 1854, C., who had twelve years before attained the dignity of colonel, was appointed to the command of the Highland Brigade, and gained for himself a very high reputation for gallantry and practical skill by his conduct at the battles of Alma and Balaklava, at the latter of which, with nothing more substantial than the 'thin red line' of the 93d Highlanders, he beat back the Russian cavalry. C. was now made major-general, was created a Knight Grand Cross of the Order of the Bath, received the Cross of the French Legion of Honour, and was made Inspector-General of Infantry; while he became popular with his countrymen generally from the care which, like Wellington, he took of his men. C. reached the summit of his fame in 1857, when, as commander of the forces in India, he finally crushed the Sepoy mutiny and saved the English Empire in India. In 1858 he was created a peer under the title of Baron Clyde, while the East India Company granted him an annuity of £2000. He returned from India in 1860, and died 14th August 1863.

Campbell, George, D.D., a distinguished Scottish theologian, was born at Aberdeen, 25th December 1719, studied first law and then divinity, became in 1746 minister of Banchory-Ternan in Aberdeenshire, and in 1759 Principal, and in 1771 Professor of Divinity, at Marischal College, Aberdeen. His death took place April 6, 1796. C.'s reputation rests chiefly upon two works—his *Treatise on Miracles*, acknowledged to be even yet the ablest answer to Hume's celebrated essay, and his *Philosophy of Rhetoric*, long the standard work on the subject, and not yet superseded. He also wrote a *Translation of the Gospels, with Preliminary Dissertations and Notes*. After his death appeared his *Lectures on Ecclesiastical History* (2 vols. 1800), to which a memoir of his life was prefixed.

Campbell, John, Lord, son of the Rev. Dr George Campbell, minister of Cupar, Fifeshire, was born near Cupar, 15th September 1781, educated at St Andrew's, and at the close of the century removed to London, where he was employed as a reporter on the *Morning Chronicle*. He was entered at Lincoln's Inn, November 1800, called to the bar in 1806, became a benchman in 1827, was elected M.P. for Stafford in 1830, for Dudley in 1832, and for Edinburgh, which he continued to represent for seven years, in 1834. Appointed Solicitor-General by the Whig Government in 1832, and Attorney-General in 1834, he was promoted Chancellor of Ireland, and created a peer of England with the title of Baron C. in 1841. In 1846 he published the first series (3 vols. 8vo) of his *Lives of the Lord Chancellors and Keepers of the Great Seal of England, from the Earliest Times to the Reign of King George IV.* The subsequent 5 vols. appeared respectively in 1846 and 1847. His *Lives of the Chief-Justices of England, from the Roman Conquest to the Death of Lord Mansfield*, was published in 1849. In 1850 C.

was appointed Chief-Justice of the Court of Queen's Bench, and in 1859 the Chancellorship of England, the highest honour of his profession, was conferred upon him. He died 23d June 1861. C. has not a great name either in law or literature.

Campbell, Thomas, a favourite English poet, was born July 27, 1777, at Glasgow, where his father was a merchant. C. displayed poetical ability while at college, and studied letters in preference to law during his course at Edinburgh. In 1799 appeared his *Pleasures of Hope*, a work immediately and lastingly successful. In 1802, after visiting the Continent, he published a 7th edition of this early work, along with some of his finest lyrics—*Battle of Hohenlinden*, *Ye Mariners of England*, &c. In 1803 C. married his cousin, Miss Sinclair, and commenced a literary career at London. In 1806 he received a pension of £200, and in 1809 published *Gertrude of Wyoming*, with the exquisite accompaniments of *Lord Ullin's Daughter*, and the *Battle of the Baltic*. A subsequent edition contained the fine ballad of *O'Connor's Child*. After this he travelled abroad, lectured on poetry, and edited periodicals. C.'s later works, chiefly biographical, had in general a chill reception, and were far from sustaining his earlier reputation. In 1827 came the 'crowning honour' of his election to the Lord Rectorship of Glasgow University, an honour which was thrice conferred on him. He died at Boulogne, 15th June 1844, and was buried in the Poet's Corner, Westminster Abbey. C. has a secure place in English literature, but not through his longer works. His *Pleasures of Hope* is a melodious, semi-didactic poem, chiefly notable for puerile bursts of sentimental eloquence; *Gertrude of Wyoming* has some scattered beauties that partly compensate for the tedium of the tale; while *Theodoric* is insupportably dull throughout; but half-a-dozen of his lyrics are unsurpassed in English, and will keep his memory green to the close of time. See *Beattie's Life of C.* (Lond. 1849).

Campbell Island, a small island in the S. Pacific, in lat. 52° 33' S., and long. 169° 9' E., about 450 miles S. of New Zealand. It is a place of some note on account of its fine harbours and its rare flora.

Camp'belton, a seaport on the E. coast of the peninsula of Cantire, Argyleshire, on a beautiful loch, 2 miles long by 1 broad, with a depth of water from 6 to 13 fathoms, and forming an excellent harbour. C. has numerous distilleries; it imports barley and coal, and exports whisky, sheep and cattle, and herrings. C. joins with Ayr, Inverary, Irvine, and Oban, in returning one member to Parliament. Pop. (1871) 6688. The ancient name of C. was *Dalruadhain*, and it was the first residence and capital of the Dalriad Scots. The place retained its ancient name till the beginning of the 18th c., when it was raised to the rank of a royal burgh, and took its present name out of compliment to the Duke of Argyll.

Campeach'y, or **San Francisco de C.**, a flourishing seaport of Mexico, lies on the Bay of C., on the W. coast of Yucatan, at the mouth of the Rio de San Francisco. It is defended by a citadel, and has a college and a theatre. There is an active trade in logwood, wax, cotton, &c. Pop. 15,500. C. was founded by the Spaniards in 1540, and belonged to the English from 1659 to 1678. The surrounding district produces much rice, sugar, salt, and marble.

Camp Equipage, the appliances necessary for military encampment. The phrase refers to the domestic wants of the soldiers rather than to their warlike equipment. Tents, furniture, fittings, and the various utensils included in C. E. are supplied to the army in a fixed proportion to the number of troops.

Camperduin', or **Camperdown**, a small village in the province of N. Holland, Netherlands, 8 miles N.W. of Alkmaar, gives name to a naval victory of the English, under Admiral Duncan, over the Dutch, gained off its coast, October 11, 1797.

Cam'per, Pieter, an able physician, skilful anatomist, learned author, and accomplished artist, was born at Leyden, May 11, 1722. He became Professor of Medicine at Franeker in 1750, at Amsterdam in 1755, and at Groningen in 1765, a post he resigned in 1773. After some time spent in travel, C. was elected a member of the State Council in 1787, and removed to the Hague, where he spent the rest of his life. The theory

of art was advanced by his work on the connection of anatomy and drawing. He died at the Hague, 7th April 1789. C.'s collected writings, *Œuvres qui ont pour Objet l'Histoire Naturelle, la Physiologie et l'Anatomie Comparée* were published (with plates) at Paris in 3 vols. 1803.

Camp Followers, non-combatants who follow an army for purposes of personal attendance, domestic service, trade, and pleasure. They are a necessity in every army, but in India, owing to the habits and customs of the country, they are extraordinarily numerous. When Sir Colin Campbell, on June 2, 1858, marched the final stage for the relief of Lucknow, the C. F. numbered 60,000—consisting of officers' servants, ostlers, cantineers, sutlers, water-carriers, and a host of other less needful persons, male and female. In European armies C. F. are placed under the control of the commanding officer.

Cam'phine, oil of turpentine rectified by redistillation with potash and water. It is employed for burning in lamps of peculiar construction, which supply a well-regulated abundance of air, essential to the complete combustion of the carbon present in large quantity in the oil; otherwise dense smoke is emitted.

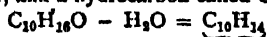
Cam'phor, a solid, essential oil, a kind of stearoptine, found in many plants, and capable of being separated from various essential oils, but chiefly obtained by boiling the chopped branches, stem, and roots of the C.-trees, when, after some time, the C. becomes deposited, and is purified by sublimation. The species from whence it is obtained belongs to the order *Lauraceæ* (q. v.), but all used in commerce is the product of *Camphora officinarum* (the *Laurus Camphora* of the older writers), a tree allied to the Cinnamon genus, and a native of China, Japan, Formosa, and Cochinchina, and now naturalised in Java and the West Indies. The flowers and every other part of the tree smell strongly of C., and the wood being light, durable, and not liable to be attacked by insects, is greatly valued by the cabinetmaker. Most of the C. sold in commerce is obtained from the island of Formosa, and is distinguished from other camphors by the name of *Laurel*, *Common* or *Official C.*

Borneo or Sumatra C. is obtained from *Dryobalanops aromatica* or C., a large tree, native in Borneo and Sumatra. From the stem is obtained, by making incisions, a hydrocarbon, with an odour 'resembling a mixture of cajuput oil, C., and cardamoms' (Basley), which is known as *Liquid C.*; it is used for making scented soap. In the fissures and cavities of the interior of the trunk are extracted pieces of the solid *Sumatra C.*, which can only be obtained by cutting down and chopping up the tree. Generally the pieces are small, but sometimes they have been found as large as ten or twelve lbs. The liquid oil can only be obtained from immature trees, while the C. is found in old ones; hence it is probable that the former becomes converted into the latter. It has much the same properties as the common C., but is never seen in commerce in Europe. The Chinese value it so highly as to give eighty or a hundred times more for it than the Laurel C.; accordingly, as it is not believed to differ from the cheaper drug in properties, the Celestials are allowed to monopolise it. They attribute extraordinary properties to it. C. in large doses is poisonous; in smaller quantities it has acrid, stimulant properties, but has no preventive power in infectious disease. The vapour destroys insects; hence the drug is put among clothes and natural history specimens, and the wood is used in making cabinets for holding entomological and other natural history specimens. C. usually arrives in Europe contaminated with various impurities. In order to purify it, it is mixed with lime, and reheated in large glass bolt-heads, when it fuses, boils, and the vapour condenses in the cool parts of the vessel in colourless crystalline masses. C. is readily soluble in alcohol, and may be obtained in brilliant octohedra by slowly evaporating the alcoholic solution; these crystals may also be prepared by slow sublimation, and are frequently found in bottles in which C. has been



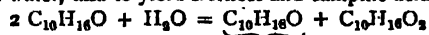
Camphora officinarum.

kept for some time, deposited on that side of the bottle which is coolest. C. is very sparingly soluble in water, but, nevertheless, communicates to it its taste and colour. Owing to its toughness, C. is difficult to pulverise, but if a few drops of spirit of wine be poured upon it, it becomes brittle, and may be powdered with ease. C. is combustible, and burns with a sooty flame. If pieces of burning C. be placed on the surface of water, they continue to burn and rotate in a very remarkable manner. C. has the composition represented by the formula $C_{10}H_{16}O$. When heated with dehydrating agents, such as phosphoric anhydride, or chloride of zinc, it loses the elements of a molecule of water, and a hydrocarbon called Cymol results.



Camphor. Water. Cymol.

Both C. and cymol are related chemically to turpentine, $C_{10}H_{16}$. Borneo C., or Borneol, differs from ordinary C. in containing two atoms more hydrogen, its composition being expressed by the formula $C_{10}H_{18}O$. It is obtained from the wood of *Dryobalanops aromatica*, and is usually found in the cavities of the old trees. It may be prepared from ordinary C. by heating it with caustic potash, the potash causing the C. to take up the elements of water, and to yield Borneol and camphic acid.



Camphor. Water. Borneol. Camphic acid.

Borneol forms small transparent brittle crystals, which have an aromatic and peppery odour and burning taste. It has no practical use.

Cam'pi, the name of an Italian family of painters, who established what is spoken of as the school of Cremona, and two of the members of which (Giulio and his cousin Bernardino) are compared by Lanzi to the Caracci.—**Giulio O.** (1502-72), the eldest, and the instructor of the others, studied under Giulio Romano. The Church of St Margaret, of Cremona, was entirely decorated by him. At Milan and Brescia many of his frescoes and pictures are still preserved. His designs are vigorous, and from the study of Titian, Correggio, and Raphael, he acquired a beauty of colour and grace of expression which raised the school of Cremona above that of Mantua. He excels his brothers in grandeur of style and in anatomical knowledge, and yields to Bernardino only in purity of design.—**Antonio O.**, brother of Giulio (born before 1536, and still living in 1591), architect, painter, and author of a History of Cremona, which he illustrated with his own designs in copperplate.—**Vincenzo O.** (1532-91) excelled in portraits and fruit-pieces.—**Bernardino O.** (1525-90), the 'Annibale Caracci' of the school. He studied at Mantua, and copied the 'Eleven Cæsars' of Titian, adding a twelfth, which was in no way inferior to the others. His designs are more timid, but more correct, than those of the brothers C. His chief works embrace his 'St Cecilia,' 'St Catharine,' and the 'Ascension' in Cremona; his 'Saviour,' 'Virgin,' and 'Transfiguration' at Milan, and his 'Virgin Weeping over the Body of the Saviour' in the Museum of the Louvre.

Camp'i'nas, or **Campanha**, a town of Brazil, province of Minas Geraes, 160 miles N.W. of Rio de Janeiro, has an export trade in coffee and sugar. In the surrounding hills are several gold-mines. Pop. 6000.

Cam'pion. See LYCHNIS and SILENE.

Camp'li, a town in the province of Teramo, Central Italy, has a cathedral, an abbey, several convents, and manufactures of straw hats. Pop. 7500.

Campobass'o, a fortified town in the province of the same name, S. Italy, about 53 miles N.E. of Naples. Its situation is favourable for trade, and there are manufactures of cutlery. C. has a cathedral, a ruined castle, and several palaces. Pop. 14,500.

Campobell'o, an island 9 miles long and about 3 broad, belongs to New Brunswick, Dominion of Canada, and lies at the entrance to Passamaquoddy Bay. It has several good harbours, and supports a lighthouse 60 feet above high-water mark at its northern extremity.

Campo de Cripta'na, a town in the province of Ciudad Real, Spain, 75 miles S.S.E. of Madrid, with which it is connected by railway. It has some trade in corn, fruit, wine, and in coarse cloth, which it manufactures. Pop. 5260.

Campo-Formio, a village in the province of Udine, N. Italy, celebrated for the treaty of peace concluded here, October 17, 1797, between the French Republic and Austria, by which the latter power, for resigning the Netherlands and Lombardy, received as a compensation the Venetian states.

Campoma'nes, **Pedro Rodriguez**, Count of, a Spanish statesman and political economist, born in Asturias in 1723, was successively President of the Cortes, Director of the Royal Academy of History, and Minister of State. He died 3d February 1802. C. was an accomplished linguist, but his most valuable labours were his writings on political economy. The chief are *Tratado de la Regalía de Amortización* (1765), *Discurso sobre el fomento de la Industria popular* (1771), and *Discurso sobre la Educacion popular de los Artisanos y su fomento* (1775).

Campo Santo, a famous cemetery in Pisa, consecrated to the memory of those who have deserved well of their country, and which has given its name ('Holy Field') to every burying-ground in Italy. It dates from the end of the 12th c., having been consecrated by Archbishop Ubaldo, who, when driven from Palestine by Saladin, loaded his fifty-three vessels with earth of the Holy Land, and deposited it on the place now called C. S. This space is now surrounded by a wall, with an arcade on the inner side, and chapels at the N. and E. ends. The structure was designed by the architect Giovanni Pisano, and erected under his superintendence in 1283. It has on the walls some frescoes dating before the middle of the 14th c., of great value in the history of art, and is in reality a museum of classical antiquities, in which the Pisans have for centuries stored everything interesting or curious—statues, bas-reliefs, inscriptions, sarcophagi, altars, &c.—which has come into their possession.

Campvere' (Dutch *veer*, a ferry, and Campen, the name of a village in N. Beveland), a decayed town of the Netherlands, on Walcheren Island, in the province of Zealand, 4 miles N.E. of Middelburg. It is now called simply Vere or Veere, and has a port on the *Veersche Gat*, which flows between Walcheren and N. Beveland. There are such relics of former prosperity as the town-house with its elegant tower, a fine cathedral, and an hospital. C. has one calico-factory. Pop. (1873) 925. C. has a curious historical interest. In the 17th c. it first proclaimed the Prince of Orange, William III., Stadtholder. Trading connections of a peculiar kind existed between it and Scotland for nearly four centuries; the Scotch staple-right having, in 1444, been transferred from Bruges to it after Wolfard, Lord of Vere, Sandenburg, &c., married Mary, the sister of James I. of Scotland. This right conferred on C. the privilege of receiving and selling first all goods from Scotland destined for the Netherlands. Scotchmen in the town formed a separate community, with many privileges. They had the right to be governed by the law of their native land, and lived under the rule of a 'Conservator of the Scotch Nation,' an office which existed as a sinecure down to 1847, since which time it has been abolished.

Campy'lospermes, a sub-order of *Umbellifera* (q. v.), in which the endosperm of the seeds is rolled inwards at the margins, and presents a vertical furrow on its face. Ex. *Anthriscus*, *Conium*, *Cherophyllum*.

Camtoos', a small river at the Cape of Good Hope, rises in the Nieuweld range to the E. of Beaufort, is useful for irrigation, and enters St Francis Bay, to the W. of Port Elizabeth, after a course of 200 miles.

Camucci'ni, **Vincenzo**, an Italian painter, was born at Rome about 1775. In youth he painted scenes from early Roman history—'Romulus and Remus,' 'Horatius Cocles,' 'Departure of Regulus for Carthage,' 'Death of Virginia,' 'Death of Cæsar'—in the pseudo-classic style brought into vogue by David in the first French Empire. He also painted many sacred subjects and portraits. His reputation was great, and to worldly riches he added the esteem of all who knew him. But he could not divest his work of pseudo-classicism. The able French critic Pierre Guérin says of him, 'He devours the old masters, but cannot digest them.' C. died 2d September 1844.

Ca'mus, Armand Gaston, one of the most sincere and decided of French revolutionists, was born at Paris, April 2, 1740. Trained to a knowledge of ecclesiastical law, and a keen Jansenist, he rose to the post of Advocate-General of the French clergy. When the Revolution began in 1789, C. threw himself heartily into it, exposed the extravagance of the court of Louis XVI., and sent from Belgium his vote for the King's death. Attempting to arrest Dumouriez (1793), he fell into the hands of the Austrians, who kept him for two years and a half, when he was exchanged for a daughter of Louis XVI. In a short time he was President of the Council of Five Hundred, but resigned, May 29, 1797, to give himself up to literary pursuits. He died of apoplexy, November 2, 1804. C.'s last public act (1802) was to write against Napoleon's proposed consulship for life. His writings, chiefly historical and bibliographical, are not of sufficient importance to merit notice.

Ca'mwood, or Barwood, a dyewood yielding a brilliant permanent red colour, and used with sulphate of iron to dye the now almost obsolete Bandana handkerchiefs. It is the wood of *Baphia nitida* (natural order *Leguminosæ*, sub-order *Casalpinia*), a native of Sierra Leone and other parts of Africa.

Ca'na ('the reedy'), a village of Galilee, and, according to John, the native place of Nathaniel, and the scene of our Lord's first miracle. The traditional site is at Kefr Kenna, a village 4½ miles N.E. of Nazareth; but within the last few years it has been thought by some that the ruins of another village 9 miles N. of Nazareth, called Kana-el-Jelil, have a better claim.

Ca'naan. See PALESTINE.

Can'ada, Dominion of, the most extensive of the British colonial possessions, is practically coextensive with British N. America. It is bounded E. by the Atlantic, N.E. by Davis Strait and Baffin's Bay, N. by the Arctic Ocean, N.W. by the United States territory of Alaska, W. by the Pacific, and S. by the United States, and by the Lakes Ontario, Erie, Huron, and Superior. Its greatest breadth, from Cape Canso to the mouth of Fraser River, is 2800 miles, and its extreme length, from the United States frontier to Cape Barrow, 1700 miles, while it has a coast-line of at least some 12,000 miles. The W. coast is greatly indented, but has no large inlets; on the E. coast are the Bay of Fundy and the great Gulf of St. Lawrence, which, however, is much surpassed in size by the vast northern inland sea known as Hudson's Sea or Bay. The area is nearly equal to that of Europe, and the following table gives the divisions and populations according to the census of April 3, 1871:—

Provinces.	Area in sq. miles.	Population.
Ontario	121,260	1,620,851
Quebec	120,020	1,191,516
Nova Scotia	18,660	387,800
New Brunswick	27,105	285,594
Manitoba	2,891,734	11,933
British Columbia	213,000	10,586
Prince Edward Island	2,173	94,021
Total	3,483,952	3,602,321

The only portion of British N. America not yet included in the confederation is Newfoundland, but as it is certain in time to throw in its lot with the Dominion, provision was made for its admission in the Act of Union of 1867.

Physical Aspect.—The country is one of vast lakes and magnificent rivers, but is comparatively destitute of great mountains. The only ranges of importance are the Rocky Mountains in the W., the Laurentian range N. of the St. Lawrence, and the Green Mountains in Quebec province, S. of the St. Lawrence. The great western range, which rises upon an elevated plateau, and increases in height from N. to S., runs throughout the whole length of the Dominion in a direction nearly parallel to the coast-line. It consists of three chains, and in the most easterly of these, near the sources of the Saskatchewan, rise Mount Brown (15,990 feet) and Mount Hooker (15,700 feet), the loftiest heights in the Dominion. The Laurentian range, which runs in a direction from S.W. to N.E., forms a natural boundary between Labrador and the provinces of Quebec and Ontario. To the E. of the Rocky Mountains, and extending to the Hudson Sea, is the immense plain of Manitoba, formerly the Hudson Bay Company's territory, bounded N. by the Arctic Ocean, and S. by the United

States, the greater portion of which is merely hunting-ground. This plain consists (1) of a barren, frost-bound polar region; (2) of a fertile tract of prairie land stretching from Winnipeg and Red River to the Rocky Mountains, a distance of 1000 miles, and having a breadth of 350 miles; and (3) of an almost impassable country of rock, river, morass, and forest, lying between the Red River and Ontario. Among the chief lakes of the Dominion are Winnipeg, Athabasca, Slave Lake, and Great Bear Lake. The principal rivers are the Mackenzie, flowing into the Arctic Ocean, and the Saskatchewan, Peace, Athabasca, and Churchill, all threading a string of lakes before entering Hudson's Bay; the Abbatibbe, Moose, Albany, E. Main, and Rupert, rising on the N. frontier of Ontario and Quebec, and flowing into James Bay; the St. John, with a course of 500 miles in New Brunswick, which it partly separates from the state of Maine; and the Ottawa, which waters Ontario, and is the most important tributary of the St. Lawrence. It is, however, the mighty St. Lawrence (q. v.) itself, with its splendid series of lakes, that gives the Dominion, in common with the United States, pre-eminence, in point of hydrography, over every other country in the world. This river, which is of the utmost value to commerce, drains an area of 400,000 sq. miles, and enters the Atlantic after a course of 2000 miles. The five famous lakes, Ontario, Erie, Huron, Michigan, and Superior, have together an area of 120,000 sq. miles, which is about half the fresh-water surface of the globe. By far the most favoured and fertile provinces of the Dominion are Quebec and Ontario, while New Brunswick is densely wooded, and the cultivated parts of Manitoba are singularly productive. The vast peninsula of Labrador, forming the N.E. portion of the territory, and extending N. between Hudson Bay and the Atlantic, is almost uninhabited, and presents a desolate and broken surface. To the W. of the Rocky Mountains, British Columbia, which is watered by the Simpson, Frances, and Fraser, presents a soil admirably suited to the growth of cereals, and is remarkably rich in timber and mineral treasure.

Islands.—The principal islands of the Dominion on the E. are Cape Breton, Prince Edward and Magdalen Islands, and Anticosti, in the Gulf of St. Lawrence. A group of over forty are scattered along the rugged W. coast, and of these the chief are Vancouver, Queen Charlotte, Prince of Wales, Sitka or New Archangel. In the great Arctic Archipelago are Cumberland and Cockburn Islands, Albert Land, Bank's Land, Melville Island, Victoria Land, Southampton Island, and the Parry Isles.

Climate and Botany.—The climate of the Dominion generally is more extreme, both in summer and winter, than that of corresponding latitudes in Europe. The most populous of the provinces are, in this respect, extremely healthy, showing a high rate of longevity. Ontario and Prince Edward Island enjoy the mildest winters in the territory, yet the St. Lawrence is frozen for about five months in the year. Summer, at all times short here, is occasionally oppressive, giving rise to severe droughts; a delightful Indian summer preludes the season of skating and sleighing. During winter there is little rain or wind, and no thaw occurs sufficient to spoil the sleigh-roads. Even when the temperature is very low, the air is bright, keen, and exhilarating. The following table gives the mean temperature in degrees Fahrenheit at various stations throughout the Dominion, taken in 1872-73:—

Province.	Station.	July.	December.
Ontario	Toronto	70°	18°
Quebec	Montreal	71°	13°
Nova Scotia	Halifax	64°	22°
New Brunswick	St. John	60°	16°
Manitoba	Winnipeg	67°	9°
British Columbia	Spence's Bridge	75°	21°

Among the chief obstacles to the agriculturist are the periodical plagues of grasshoppers and mosquitoes, the length of the winter, the want of means of ready communication, the presence of ague-breeding swamps, and the inundation of the rivers on the melting of the snows. The great forests of New Brunswick, Quebec, Ontario, and parts of Manitoba, consist mainly of red and white pine. Among the other forest trees are the oak, ash, beech, cedar, poplar, birch, alder, willow, and maple. Much sugar is manufactured from the maple, and the evergreen balsam-fir (*Abies*

balsamus) yields a fine varnish. In the growth of cereals, no country excels Quebec, Ontario, and the Red River Settlement. Wild fruits are abundant, and near the lakes the grape and peach ripen in the open air. The vast prairies of the W. are interspersed with forests, where thickwood plants furnish excellent pasturage. The vetches grown here are as suitable as European clover for the nourishment of cattle.

Zoology, Geology, and Mineralogy.—In Manitoba there are immense herds of buffaloes, and among other animals in the Dominion are the bear, deer, elk, wolf, and moose. The lakes and rivers are amply stocked with fish, including the sturgeon, trout, pike, gold-eyed carp, whitefish, catfish, &c. The Gulf of St. Lawrence is one of the most valuable cod-fishing grounds in the world, and in the N. there are also extensive seal and whale fisheries. The partridge and duck are among the common game, and there are numerous beautifully-plumaged birds, but they are all destitute of song. The geological formation of the region to the N. of the St. Lawrence is that to which the river gives name (*Laurentian*), and is interrupted by masses of granite and veined by syenite and greenstone. One of the chief minerals in the Upper Laurentian of Labrador is *Labradorite*. In the Rocky Mountains the metamorphic gneiss contains talcose slates, gold-bearing quartz, and deposits of silver, &c. The Devonian system occurs in W. Canada, and abounds in fossils. The Dominion is particularly rich in the variety and extent of its minerals and rocks, of which the most important are ores of iron, copper, and lead, coal, limestone, petroleum, serpentine, honestone, marble, roofing slate, building stone, and mill-stones. In Columbia, at the confluence of the Fraser and the Thomson, one of the richest goldfields in the world was discovered in 1860. An auriferous drift covers a wide area on the S. side of the St. Lawrence, and gold has also been found on the St. Francis River, on the Etchemin, on the Chaudière, in the country between Red River and Lake Superior, on the Peace River, and elsewhere. Along the E. base of the Rocky Mountains runs a belt of lignite coal, nearly 1000 miles long, from 2 to 8 feet thick, and having a breadth in some parts of 200 miles. There are also vast deposits of coal in Nova Scotia.

Commerce and Communication.—The increasing prosperity of the Dominion is nowhere more clearly seen than in the steady development of its trade. The value of imports from Great Britain was in 1863 £6,209,046, and in 1873 £14,275,576. There is also a great trade carried on with the United States, the exports to that country in 1873 amounting to £8,448,886. In the same year the total value of exports was £18,706,233, and of imports £26,669,017. The two staple articles of export are wood and breadstuffs. In 1873 the value of timber, chiefly hewn and sawn, exported to Great Britain, was £5,196,083; of wheat, £2,489,272; of maize, £397,465. New Brunswick supplies the greatest quantity of wood, and the valley of the Ottawa the finest quality. Among the other exports are oats, oatmeal, peas, and fish. The imports are mainly iron, wrought and unwrought, and cotton and woollen goods. Montreal is the great commercial centre.

In 1873 the Dominion possessed a network of railways of a total length of 3478 miles, while there was in course of construction other lines to the extent of 1250 miles. Besides this, 3000 miles more had been surveyed, including the proposed railway across the entire Dominion from the Atlantic to the Pacific, towards the construction of which the British Government had consented to contribute a grant in the form of a guarantee loan of £2,500,000. It is designed that the Dominion Pacific Railway shall be carried in its whole length through British territory, and shall be continued from the mainland to Vancouver's Island by means of a bridge at Seymour's Narrows. This line is confidently expected not only to give a vast impulse to the mines and granaries of the W., but to promote a trans-continental trade with Asia. Of the existing railways, the most extensive is the Grand Trunk, which runs in an unbroken line from Portland, in the United States, to Lake Huron and Detroit, crossing the St. Lawrence at Montreal by the stupendous Victoria Bridge. Montreal has direct communication with Halifax and St. John since the recent completion of the Megantic, International, and the Intercolonial railways. The great water-system of C. is perhaps a still more important means of transit, extended and improved as it has been of late years. By the deepening of Lake St. Peter, vessels of 1800 tons can now reach Montreal, and sea-going ships are enabled to avoid the rapids between that city and Lake Ontario by means of canals.

The obstacle to navigation also presented by the Niagara Falls has been overcome by the Welland Canal connecting the lakes Ontario and Erie. These facilities have been further supplemented by similar American works between Lakes Huron and Superior.

Government, Finance, &c.—The constitution is similar to that of the United Kingdom, and the executive authority is vested in the sovereign of Great Britain, who is represented by a Governor-General, exercising authority with the aid and advice of the 'Queen's Privy-Council of Canada,' the members of which body are chosen by himself as occasion may require. The Legislature consists of an upper house or Senate, of 80 members, and a House of Commons, of 205. A bill may be passed by both houses of Parliament, and even be assented to by the Governor-General, and yet be disallowed by the British sovereign in council. Senators are appointed for life by the Governor-General, and must reside in the provinces they represent, and possess 400 dollars of real property. Members of the Lower House are elected for five years, and choose their own speaker. Ottawa is the capital of the Dominion, and the seat of the Legislature.

Each province has its own Legislature and executive, and is presided over by a Lieutenant-Governor chosen by the Governor-General. These local Legislatures levy taxes for provincial purposes, control educational affairs, &c. In the financial year ending June 30, 1875, the estimated revenue of the Dominion amounted to £4,400,000, and expenditure to £4,950,000. The public debt, incurred chiefly on account of public works, and the interest of which forms the largest branch of the expenditure, amounted on 1st July 1873 to £21,935,949. The total charges on the debt during the financial year 1873 were £1,158,002.

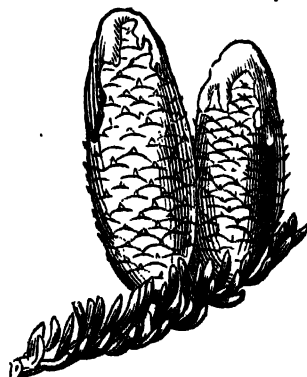
Army and Navy.—The defence of the Dominion is provided for by a large volunteer force, a newly-organised militia, and an imperial force, forming the garrison of Halifax, and permanently reduced to 2000 men in 1871. All male British subjects between the ages of eighteen and sixty are included in the militia, which is divided into an active and reserve force. In 1875 the active force was reduced to 30,000 men and officers. The Dominion is portioned into eleven military districts, of which four are formed by Ontario, three by Quebec, and one by each of the other provinces. There are four schools of instruction for infantry. In 1872 the naval force on the great lakes and the St. Lawrence numbered eight armed screw-steamers.

Religion, Education, &c.—The Dominion has had no Established Church since 1853, when the Act of 1823, reserving a certain portion of the land for the support of the Protestant clergy, was repealed. Nine bishops govern the Church of England; four archbishops and fourteen bishops the Roman Catholic Church; and the Presbyterian Church, or rather that portion of it not of Free Church and U.P. origin, was until June 1875 connected with the Church of Scotland. In that year the different Presbyterian denominations united to form one Presbyterian Church, and the connection with the mother Church at home came to an end. In 1871 there were 1,492,029 Roman Catholics, 544,998 Presbyterians, 494,049 Anglicans, 567,091 Wesleyans and Methodists, 239,343 Baptists, 37,935 Lutherans, and 21,829 Congregationalists. In addition there is the utmost variety of minor sects. In Quebec and Ontario education is regulated by laws specially adapted to the prevailing religious elements. The common schools in the Dominion are supported partly by Government, partly by local rates, and occasionally by the payment of small fees. All common-school teachers are examined by a county board of education before they can claim a Government allowance. The inhabitants of Quebec, who are to the extent of four-fifths descendants of the original settlers, speak the French language.

History.—In 1535 Jacques Cartier discovered the St. Lawrence; and from hearing the Indians make frequent use of the word *Kanata*, a village (hence C.), carried away the impression that the name applied to the whole country. In 1608 Champlain founded Quebec, the first permanent settlement on the St. Lawrence. During 1676 and 1687, La Salle explored Western Canada and the basin of the Mississippi, to which the French therefore naturally laid claim. But the result of the famous war of 1759-60 was the surrender (1763) to Britain of nearly the entire possessions of the French in the New World. At the conclusion of the American War of Independence (1783), Britain lost not only her own revolted colonies, but also that portion of territory W. of the Alleghanies, which she had previously wrested from

France. C. proper was divided into two provinces in 1791. These were reunited in 1840, and were again separated on the establishment of the Confederation in 1867. The Confederation, including also Nova Scotia and New Brunswick, formed the basis of a dominion to which was added, in 1869, the vast territory of the Hudson Bay Company. This acquisition, now known as the province of Manitoba, cost the Canadian Government £300,000. In 1871 the Confederation was augmented by the addition of British Columbia, and in 1873 by that of Prince Edward Island. Provision, as already stated, has been made in the Act of Union for the admission of Newfoundland—the only portion still excluded of British N. America. See De Charlevoix, *Histoire et Description de la Nouvelle France* (3 vols. Par. 1744); M'Gregor, *British America* (2 vols. Lond. 1832); J. MacMullen, *History of C.* (Brockville, 1868), and the works of Brasseur de Bourbourg (1852), J. Hutton (1857), Wilkinson (1861), Hunt (1865), Russell (1865), Kirke (1871), and Marshall (1871).

Canada Balsam is a turpentine obtained by incision of the stem of *Abies balsamea* (Balm of Gilead fir), a native of



Canada Balsam.

Canada and the United States. C. B. is obtained chiefly from Canada and the state of Maine. It is contained in receptacles between the bark and wood, and when an incision is made into them, C. B. flows out and is received into bottles. It is imported in barrels, each containing about 1 cwt. C. B. is an oleo-resin of pale yellow colour, of the consistence of thin honey, having a bitter taste and a peculiar odour. By exposure to the air it dries very slowly. It consists chiefly of *Resin* (q. v.), and about 18 per cent. of a volatile oil. It is used in medicine in doses of 20 to 30 grains to check discharges from the mucous surfaces. It is also used for making *blistering* paper. It is also much used for making varnishes, for cementing glasses by the optician, and for mounting microscopic preparations. C. B. is not a *true* Balsam (q. v.), but a Turpentine (q. v.).

Canada Goose. See GOOSE.

Canada Rice, or Swamp Rice (*Zizania aquatica*), a grass growing on the edges of lakes in Canada and the northern United States. It is collected by the Indians and the backwoods settlers for the sake of the grain, which can be used as food.

Canada Snake-Root, or Wild Ginger, the rhizome of *Aristolochia Canadensis*, a plant belonging to the birthwort order (*Aristolochiaceæ*), used in Canada and the United States as a 'tonic diaphoretic and aromatic stimulant.'

Can'agong, or Pig's Faces (*Mesembryanthemum squarrolatum*), a plant of the order *Mesembryaceæ* (q. v.), the fruit of which is eaten in Australia.

Canal. Strictly speaking, every artificial channel for water may be called a C., but in general the word is restricted to channels constructed for the purpose of navigation. The use of such canals is very ancient; they were constructed by the Egyptians, the Chinese, and probably other Eastern nations, long before the commencement of our era, about which time they seem to have been introduced into Europe, where for many centuries their employment extended very gradually. This slow progress was no doubt greatly owing to their still wanting the crowning improvement necessary to adapt them for routes having great alterations of level—the *lock*. In some of these early canals inclined planes, up which a vessel placed upon a cradle could be hauled, were employed, along with suitable stop-gates, so that they were not necessarily all at one level; but this contrivance, as then used, was very inadequate, and could only be employed to a limited extent. The lock, as now used, was not invented until the 14th c. By its introduction—the credit of which is

claimed both by Italian and by Dutch engineers—the construction of canals for inland navigation received a fresh impetus. It is, in fact, only at this time that the history of modern canals may be said to have commenced. The oldest C. in England was originally a Roman cutting—the Foss Dyke—which extends from Lincoln to the Trent near Torksey, about 11 miles. It was deepened in the time of King Henry I., and again in 1782 by Smeaton, but it remained in a very defective condition until 1840, when the Stevensons of Edinburgh were employed to deepen it to 6 feet, and widen it to 40 feet throughout, and render it thoroughly efficient. In 1868 there were seventy-four canals, of 2431 miles, in England and Wales.

One of the greatest canals upon the Continent was completed as early as 1681. This is the Languedoc C., designed by Riquet to connect the Atlantic with the Mediterranean. It is 148 miles long, rises 600 feet, and has over a hundred locks and fifty aqueducts. It seems strange that the successful execution of so great an undertaking should not have been sufficient to stimulate English engineers to work in the same direction, but it was not until nearly a century later that James Brindley (q. v.), working with the Duke of Bridgewater, fairly started the making of navigable canals in this country, as he really did in making the Bridgewater C. from Worsley to Salford in Lancashire. After this time (the Bridgewater C. Act was obtained in 1759), the construction of navigable canals occupied the attention of all the great English engineers—Smeaton, Watt, Rennie, Telford, and many others—for many years; indeed, until the railways superseded every other means of locomotion. It is not likely that canals will be ever again made in this country, nor indeed elsewhere, except under such conditions as those of the Suez C., where the object is to shorten very greatly the voyages of ships.

In constructing a C., the engineer has first to look to the means of obtaining sufficient water to keep the C. filled, and in default of a natural reservoir an artificial one must be constructed for this purpose. He must also provide waste-weirs for the discharge of surplus waters in floods, and discharge-slues for emptying the C. for repairs. For this purpose it is best to provide stop-gates which can divide the whole C. into short sections of a few miles, so that it may not be necessary to empty a long reach for the sake of repairing some local fault. It is generally best, where practicable, to place a number of locks together, rather than to distribute them over the length of the C. Inclined planes have often been used instead of locks where some very great difference of level has to be surmounted, the objection to locks being the time and labour unavoidably spent in getting through them. In these cases the vessel is floated on to a carriage and steadied there, and carriage and vessel are then hauled up an incline of about 1 in 10 by steam or water power. Perpendicular lifts have occasionally been used also for this purpose.

Among the greatest canals now in use are the following:—The Great N. Holland C. (designed by M. Blanken), completed in 1825, and extending from Amsterdam to the Helder, 51 miles long, 125 ft. broad at the water-level, 31 ft. at the bottom, and 20 ft. deep; the Caledonian C. (q. v.); the Morris C., connecting the Hudson and Delaware rivers, 101 miles long, and having a rise and fall of 1557 ft., mostly arranged with inclined planes; the Forth and Clyde C., 45 miles long, 27 ft. wide at bottom, and 9 ft. deep, with 155 ft. rise, &c. Among the principal English canals for the conveyance of barges only (and therefore much shallower than the preceding) are the Leeds and Liverpool C., 128 miles long, 433 ft. rise; the Trent and Mersey C., 93 miles long and 326 ft. rise, &c.

The greatest C. in existence is that connecting the Mediterranean and the Red Sea, for which see SUZ CANAL.

Canale, Antonio, usually called **Canaletto**, an Italian painter, born at Venice, 18th October 1697. His father was a scene-painter, and he himself for a time followed that occupation. Removing to Rome, he assiduously studied from nature, and on his return to Venice painted its picturesque palaces, churches, and canals with wonderful fidelity and brightness. C. died 20th August 1768. His almost innumerable works are to be seen in all the galleries of Europe; but the finest of them, 'The View on the Grand Canal, Venice,' is in the Museum of the Louvre.—His nephew and pupil, **Bernardo Bellotto C. or Canaletto**, born at Venice in 1724, died at Warsaw in 1780. After painting for a time at Venice, he travelled to Rome,

Verona, Brescia, Milan, and Dresden, where he was admitted member of the Academy. He afterwards sojourned in London, where he painted an interior of King's College Chapel for Horace Walpole. Knowledge of perspective and accuracy and vigour of drawing, especially in giving effects of light, are his chief merits, as they were also those of his uncle.

Canals, Intercellular. In most cases cells are united to the contiguous ones so closely as to leave no appreciable spaces between them (the 'perfect parenchyma' of Schleiden), yet in various plants the cells only touch each other at one or two points, leaving, as in the green pulpy parenchyma, spaces between them, known as I. C. In shape they vary much. Most probably they only contain air.

Canami'na, a small town in the kingdom of Dahomey, Africa, Guinea-Coast, lies 13 miles S. of Abomey, on the direct road to the shore. Pop. 10,000. A house here is devoted by the king to the use of white travellers.

Cananore, a town of British India, province of Madras, on the Malabar coast, 50 miles N.N.W. of Calicut, and 100 S.W. of Seringapatam. It has cantonments, and does an active export trade in timber, grain, pepper, and cocoa-nuts. C. was captured by General Abercromby from Tippoo Sultan in 1791. Pop. 15,000.

Canarac, a town of British India, province of Bengal, division of Orissa, and district of Pooree, on the Bay of Bengal, has remains of a gigantic pagoda, now in great part removed to the Temple of Juggernaut. The pagoda is estimated to have covered 13 acres, and some of the blocks are 15 feet long and 8 broad, consisting mainly of black basalt and granite.

Canarose. See DRAVIDIC LANGUAGES.

Canaries, or **Canary Islands**, a group of seven Spanish islands, and of several rocky islets, in the Atlantic, off the coast of Africa, lat. 27° 40'–29° 25' N., long. 13° 25'–18° 16' W. They are Hierro or Ferro, Palma, Gomera, Tenerife, Gran Canaria, Fuerte Ventura, and Lanzarote. Gracioso and Alegranza are the largest of the islets. Area, 2810 sq. miles; pop. (1870) 283,859. The islands are of volcanic origin, with steep and rugged coasts, while the surface is partly mountainous, the *Pico de Teide* (Peak of Tenerife) rising to the height of 12,182 feet. Streams are numerous, but there are no rivers of any note. The climate is generally healthy, the temperature ranging from 87° F. in October to 60° F. in January. Vegetation, both tropical and European, is luxuriant in the valleys where there is sufficient moisture, but the S.E. wind (El Levante), blowing in November and February, or at the beginning and end of the rainy season, is dry and parching. The wine trade, formerly extensive, was nearly annihilated by the drought (*oidium*) of 1864, but the *opuntia* cactus has been extensively cultivated on the desolated vineyards, and cochineal is now exported largely. In addition to this there are exports of cereals, raw silk, tobacco. The imports are woollen and cotton cloths, cutlery, glass, hardware, olive oil, and wine. In 1874 the former amounted to £590,244 and the latter to £511,936. There are many regular lines between London, the Morocco ports, and the C., while the Liverpool mail-steamers to the African coast touch at Santa Cruz, Tenerife. There is a captain-general over the whole group, and each of the islands has a subordinate governor. The C. are supposed to be the Fortunate Islands of the ancients. Juba II., Prince of the Mauritanias, wrote a description of them, preserved by Pliny; and Ptolemy fixed his first meridian in the group. They were visited in the 14th c., but it was not till the following century that the Spaniards got possession of the islands, which then received their present name, because they abounded in wild dogs. After some disputes between the Spanish and Portuguese as to the possession of the C., the supremacy of Spain was established in 1493, and has been maintained ever since. The aboriginal Guanches, a superior race, who embalmed their dead, have long since disappeared as a separate people.

Canarium, a genus of plants of the natural order *Amaryllidaceae*, natives of the south-eastern parts of Asia and of the Malay Archipelago. The kernel of the fruit—a triangular drupe—of *C. commune*, which is cultivated in the Moluccas, is eaten, both raw and roasted, and an oil expressed from it is used at table when fresh, and for burning in lamps. The gum which exudes

from the bark is said to be like the balsam of Copaiba (q. v.). In Amboyna, bread is made of it. *C. sylvestre* also produces fruit, the kernels of which are eaten. *C. strictum*, of Malabar, produces the 'Black Dammar' resin. *C. microcarpum* also yields an oil like copaiba, used in shipbuilding yards under the name of DAMMAR (q. v.). *C. commune*, among other trees, is believed to yield ELEMI (q. v.).

Canary Bird, an Insectorial bird allied to the Finches (q. v.), and generally included in the sub-family of *Fringillina* or true finches. The familiar domesticated canary differs in colour and other respects from the wild birds, which are greyish or greenish yellow in hue. Domestication has tended to improve the general appearance and the song-notes of these birds, although Heineker says their song, even in the wild state, is very clear and beautiful. They derive their name from their inhabiting the Canary Islands. The nest is built of roots, moss, and feathers, and from four to six eggs are laid, of a pale-blue colour. They breed from four to six times in the season, and propagate in confinement; feed upon seeds, also grasses and the leaves of various weeds and plants. They were first brought to Europe about the beginning of the 16th c. The inhabitants of the Tyrol, and other parts of the Continent, are largely engaged in breeding and in training these and other birds to sing. The canary will interbreed with other species of finches, and the hybrid progeny or 'mules' frequently possess excellent voices.



Canary.

Canary Seed, the grain of *Phalaris Canariensis*, much used as a food for canaries, and other small domesticated birds. It is a native of the Canary Islands, but now naturalised in the S. of Europe, and in Britain and Germany, where it is cultivated. Essex and Kent are in England the chief localities where it is grown for the sake of the seed, as an article of trade, and for the purpose of preparing a fine flour from it used in finishing silk fabrics, and in dressing the finer cotton webs. In Italy, the Canaries, and Barbary it is made into a nutritious bread. *Phalaris arundinacea* is a tall, reed-looking grass, growing very commonly about the edges of lakes, marshes, rivers, and other wet places in Britain and Southern and Central Europe. *Gardener's garters*, *ribbon grass*, or *ladies' traces*, is a variety with striped leaves, well known as a garden plant. The wild plant is sometimes useful for feeding cattle, especially if cut early.

Canary Wine. The wines produced in the Canary Islands have the same character as the celebrated vintages of Madeira, for which they are sometimes substituted; but they are much inferior in quality. Indeed, the best-known C. W. is named Bastard Madeira, or Tenerife. The imports at one time from the Canary Islands into Britain were considerable, but towards the end of last century they fell away, and have not revived to any great extent.

Canaster (Span. *canasto*, 'a basket'), a rush hamper or basket in which tobacco is packed in S. America; hence a name for a kind of tobacco.

Canavalia, a genus of plants of the order *Leguminosae*. About twelve species are known, mostly shrubby climbing plants. *C. gladiata*, of the W. and E. Indies, Mexico, tropical Africa, Brazil, &c., is called the 'Overlook' by the W. Indian negroes, who plant it on the edges of their 'provision grounds,' under the belief that it exercises some mysterious power in watching or protecting their property from being plundered.

Can'celling, in law, signifies the making of a deed or other legal instrument void by drawing lines in ink over it, with consent of parties interested. A will may be so revoked, if it appear that the lines were drawn with the intention of revocation. But a cancelled writing may be produced as evidence. In Scotland, the system of registration of legal instruments greatly prevents disputes owing to their being lost or cancelled, and when necessary to know or have proof of the contents of a lost or mutilated paper, this may be arrived at and judicially declared by an

action for proving the tenor. (See TENOR, 'PROVING OF.') In England, the same result may be arrived at in a court of equity. The origin of the word *cancel* is the Lat. *cancelli* ('lattice-work'). As early as the time of Ulpian the verb *cancellare* had acquired the meaning to cross out a writing in the form of lattice-work (+).

Cancelling of Letters Patent. Letters patent, when contrary to law, may be cancelled by the Lord Chancellor. See LETTERS PATENT.

Cancer is one of the most painful and fatal diseases to which man is liable. It is essentially a constitutional disease, characterised by a local manifestation the aspect of which has given rise to the name. C. may occur in almost any organ of the body. It is prone to occur in the female breast and uterus, and for this reason it is much more common in females than in men. It seldom attacks a person under forty-five years of age. On examining C. microscopically, it is found to consist of numerous cells of various forms. These cells are nucleated, and some have several nuclei within one cell. They may form a distinct tumour, or may be infiltrated among the natural tissues of the body. As the cells are abundantly provided with nuclei, they multiply rapidly. A cancerous tumour, wherever situated, is called by the surgeon a malignant tumour. The characteristics of such a tumour are its rapid growth, its undefined outline, its tendency to involve neighbouring parts in its own peculiar structure, and to spread along the lymphatics, enlarging all the glands in its neighbourhood, its peculiar, sharp, darting, lancinating pain, often compared to that of needles darting through the tumour, and the impossibility of getting the wound to heal after the skin is broken. The discharge from a cancerous tumour is often very fetid, and frequently mixed with blood. The general appearance of the patient is very characteristic. The skin is of a dirty yellow hue. The features express great anxiety and distress—an expression of countenance difficult to describe, but not readily forgotten. There is great wasting of the whole body and general debility. See CACHEXIA. The chief kinds of C. are:—

1. *Scirrhus* or *Hard C.*—This is a very common form of C., but is seldom seen in persons under forty years of age, and generally in more advanced life. It is specially common in females; the most frequent site of this kind of C. is the female breast. It is also found in the male genital organs—the uterus, the skin, and mucous membrane. When *hard C.* attacks the female breast, it begins as a small *hard* tumour, at first movable, but soon becomes adherent to adjacent tissues, with sharp shooting pains; the breast often becomes smaller from the contraction of the tumour, the nipple is frequently drawn in, and the skin becomes fixed to the hard mass, the glands in the arm-pit become swollen and painful, and in course of time the Tumour (q. v.) opens and discharges fetid matter. When *hard C.* is removed by excision, it is found to be very hard and heavy; when cut with a knife it makes a sound as if cutting a raw potato. The two cut surfaces retract so as to become concave.

2. *Epithelial C.*, or *Epithelioma*, is the kind generally seen on the lower lip. It also attacks the tongue, the cheeks, the hands, and other parts. It may occur wherever there is skin or mucous membrane.

3. *Soft C.*, or *Medullary C.*, so called from its resemblance to brain substance. It has other names, all derived from the fact that it resembles in colour, consistence, and texture the brain. This kind is very vascular, and very rapid in its growth. Those who suffer from it seldom survive two years, and the great majority not half that time. It is full of a semi-liquid substance called '*C. juice*.' Microscopically it consists of cells like those of *hard C.* This form is the kind found in young children, and though it may occur at any period of life, even in extreme old age, yet it is most common in the young. It may also occur in any texture, but is most frequently found in bones, the eye, the testicle, and internal viscera. The form known as *Chimney-sweeper's C.* is a variety of soft C., so is the form called *Fungus hæmatoides*. Another kind of C. is called *Colloid C.* from its resemblance to *glue*. It occurs most frequently in the internal organs.

Not much requires to be said regarding the treatment of C. When the disease is situated in a part or organ that can be cut out by the knife of the surgeon, the operation ought to be performed as soon as the real nature of the disease is recognised. Patients have frequently regretted, when too late, that they re-

fused to allow the surgeon to remove a C. in the early stage of the disease. When the part cannot be excised, treatment consists in giving opiates to relieve pain, checking hemorrhage by Styptics (q. v.), as perchloride of iron, and applying soothing and disinfecting poultices to the parts affected, as hemlock leaves and charcoal. Attention must be paid to the general health; good nourishment and stimulants should be administered when the patient is weak. Nothing affects the mind of a patient more than the dread of C. Hence the necessity for early seeking the best medical advice, and acting up to the instructions of the surgeon. The so-called C. curers, of whom so much is heard in the present day, live to a great extent by working on the fears of the people—making many believe they have C. when no C. exists, and representing others as cured when the diseased part has only been made worse than before. We hear much of such people extracting C. by the '*roots*,' and actually showing these '*roots*' to their patients; the fact being, that a strong caustic, such as sulphuric acid, has been applied, the charred mass has sloughed out, and the deepest parts of the slough are represented as the C. *roots*. Nothing is known regarding the origin of C. Science can easily explain how the cells multiply when once the first are formed, but what gives rise to these first cells is still a mystery. C. is essentially a constitutional disease; it is therefore liable to be transmitted from parent to child. It also exists in some of the lower animals, although it is much more common in the human subject.

Cancer, one of the signs of the zodiac, symbol ☌, occupies a place in the ecliptic between 90° and 120° from the vernal equinox. The constellation of the same name, originally coinciding with the sign, but now no longer so on account of precession, is situated between the Twins and the Lion, but contains no star brighter than the third magnitude.

Cancer-Root, or **Beech-Drops**, the popular name in America for *Epiphegus* and *Conopholis*, as well as for *Anoplantus* (*Aphyllon*) *uniflorus*, and *Phelipæa biflora*. Usually it is applied to *Epiphegus Virginianus*, a parasitic plant of the natural order *Orobanchaceæ*, growing in the exposed roots of beech-trees, hence its popular name of beech-drops. The name of C.-R. is derived from a popular idea of its efficacy in the cure of cancer, applied both externally and internally. Its medicinal properties are in all probability imaginary, though several other plants of the same order bear a similar reputation—e.g., an infusion of the common broomrape (*Orobanche major*) is applied as a cleansing lotion to foul sores.

Cancer, Tropic of. See TROPICS.

Cancrum O'ris, a corroding ulcer of the mouth, occurring in weak, delicate young children from two to six years of age. It may arise after some exhausting disease, or in children badly nourished. It has been variously named *gangrenous stomatitis*, or sloughing phagedæna of the mouth. C. O. is characterised by swollen gums, hard swollen cheek, with white patches on the inside of the affected part. A slough is soon formed, and much of the gums, cheek, and lips slough off. There is a flow of saliva, with a very offensive breath. It is accompanied with great constitutional disturbance, and sometimes the whole side of the face sloughs off, and the patient dies exhausted. The proper treatment of the disease consists in applying a strong caustic, as nitric acid, to destroy the unhealthy textures, and in giving tonics and good nourishing diet internally. Preparations of iron and quinine, with cod-liver oil, are the most beneficial. To destroy or diminish the offensive odour from the mouth, gargles of chlorine water, Condy's fluid, or charcoal should be used.

Candahar, or **Kandahar**, a town of Afghanistan, and capital of a province of the same name, lies between the Argandab and Tarnak rivers, 380 miles S.E. of Herat. It is surrounded by a deep ditch and a mud wall in which there are six gates, and from four of these run the principal streets, about 40 yards wide, lined with shops and houses. These streets intersect C. at right angles, and at the point of meeting there is a large dome (*Charsu*) 50 yards in diameter. The town is divided into quarters, separating the different tribes and even trades, while the houses are flat-roofed, and are built of sun-dried bricks. Those of the rich are enclosed by high walls, and contain three or four courts, with gardens and fountains. C. is defended by

a citadel at its N. end, occupying the Topkhana, an open space of 196 sq. feet. To the W. lies the tomb of Almad Shah Durani, an octagonal structure of coloured porcelain bricks, surrounded by a gilded dome, which rises conspicuously above the city. The wealthiest merchants of C. are Hindus, who carry on an active trade with Bombay, *via* Shikarpur and Karachi, importing indigo, spices, sugar, calicoes, medicines, &c.; and exporting madder, assafetida, wool, dried fruits, tobacco, raw silk, rosaries, &c. The trade with Herat and Mashar is carried on by Persians, dealing chiefly in raw silk, precious stones (turquoise), carpets, weapons, brocade, and silver-braiding. The vine is extensively cultivated in suburban gardens. The chief manufactures are silks, and rosaries of crystallised silicate of magnesia. C. is supplied with water by a canal from the Argandab, but the water is polluted in the streets. The climate is delightful in winter, but extremely hot in summer, the temperature at this season reaching 150° F. Pop. 80,000. The old city of C. (*Shar-i-Kohna*) lay four miles to the W., where still are seen its ruined defences and reservoirs. It is said to have been founded by Alexander the Great, and to have been often destroyed and rebuilt by its Arab, Persian, Tartar, Turkoman, and Usbeg conquerors. In 1738 it was finally sacked by Nadir Shah, who removed its site two miles S.E. and called the new city *Nadirabad*. It was scarcely built, however, before it was destroyed by Ahmed Shah Abdali, who founded the present city in 1747. C. was held by the English during the Afghan war from 1839 till 1843.—The province of C. lies in the S. of Afghanistan, is celebrated for its fruits, and produces abundance of wheat, barley, madder, maize, rice, beans, tobacco, beetroot, musk, &c. See Bellew, *General Report of Kandahar Mission* (1871).

Candelab'rum (Lat.), an instrument used by the ancients to support a lamp. In its simplest form a C. consisted of three parts—a slender *shaft*, resting usually on a *tripod* formed of animals' feet, with a *plinth* carrying a circular plate on which the light was placed. The shaft was originally formed of cane, and afterwards, when metal was employed, the slender cane form was retained, and frequently enriched with leaves and other ornaments. Sometimes the shaft was constructed in a telescopic fashion, to be shortened or lengthened at pleasure. Many portable lamp-stands of bronze, exhibiting graceful form and rich ornamentation, have been discovered at Herculaneum and Pompeii. Numerous examples of Greek and Roman candelabra are preserved in the British Museum, the Louvre, and the Vatican. The last named is exceptionally rich in large antique candelabra of carved marble, with ornaments in bold relief, which were placed in temples for burning incense. In another form of C. a number of lamps were suspended from the branching arms of a pillar.

Can'dia. See CRETE.

Can'didate (Lat. *candidatus*, 'clad in white') denoted among the Romans an applicant for any public office, because he went about on his canvass (*ambitio*) of the electors adorned with a white or shining toga. In the early Christian Church the name of C. was given to a newly-baptized convert, from the white robe, indicative of purity, and also perhaps of freedom, with which he was decorated. In modern times the word C. has come to denote an aspirant to any office whatever, and has therefore partly gone back to its pre-Christian usage.

Candle, an artificial source of light, in the form of a long thin cylinder, or slightly conical rod, composed of fatty substances, enclosing a wick of cotton rovings twisted or plaited together. Ancient Roman candles consisted of the pith of a kind of rush surrounded with tallow or wax. In England, during the Anglo-Saxon period, ordinary candles were merely masses of fat plastered round splinters of wood. A generation ago, tallow formed the chief material employed in making candles; the recent improvements, however, in the C.-making industry have, to a large extent, displaced it, and it is now only used for the commonest forms of C. Candles are made by two processes, *dipping* and *moulding*, but chiefly the latter, and when well-made they are white, hard, glossy, dry, and not greasy to the touch.

Dips are made by stringing a number of twisted wicks upon a rod, and dipping repeatedly into a trough of melted tallow, allowing the dip to solidify after each immersion. Dipping is continued till the candles have attained the requisite thickness.

Moulds are made with moulds of thin pewter or glass, slightly tapering, which are arranged in a wooden frame with the narrow ends, which shape the points of the candles, downwards. The wicks are stretched along the axes of the moulds by means of wires, and the melted fat is then run into the moulds. Next day the candles are withdrawn, cut and trimmed at the base, and stored for use. In large manufactories, machinery is employed in moulding as well as in dipping. Before use the tallow is purified by mechanical or chemical means of its fibrous tissue and other extraneous matter.

Wax candles are seldom moulded, on account of their adhesion to the moulds, and contraction in cooling. A different method of manufacture, termed *basting*, is accordingly resorted to. It consists of pouring the wax over a series of wicks suspended from a ring of wood or metal rotating horizontally over a caldron. When the candles are about one-third of their ultimate thickness, they are rolled between marble or boxwood slabs into a smooth cylindrical form; these operations of basting and rolling are repeated as often as is necessary, and the candles finished by trimming with a knife. Wax candles, for household use, have been superseded by other kinds about to be described, but they are still employed in the Roman Catholic and Greek churches as indispensable accessories of the altar. Russian wax candles are remarkable for their beauty, elegant form, and gilt decoration.

Sperm candles, the old rivals of the wax kind, still retain their hold upon the market, and are composed of *spermaceti*, obtained from the brain of a species of whale, mixed with a little bees-wax.

Palm and cocoa-nut oils are now extensively used in C.-making, and the enormous development of late years of this industry is to be attributed to the successful separation of stearic and palmitic acids from animal and vegetable fats. Natural fats are mixtures of either of two substances, solid at ordinary temperatures, called *stearine* and *palmitin*, or of both, in a fluid constituent, termed *olein*. Each of these, again, contains an acid, called respectively stearic, palmitic, and oleic acids, in combination with a liquid organic base called *glycerine*, which can be easily removed by saponifying the fats with caustic alkalies, as in the process of soap-making. See SOAP.

'Stearine' candles.—The stearic acid which abounds in animal fats, as beef and mutton suet, lard, &c., and in cocoa-nut oil, is the material of which these candles are made. Several processes are adopted for its separation. One method is to mix the fat with lime, which results in the formation of a stearate of lime and free glycerine; the lime-soap is then decomposed by sulphuric acid, which unites with the lime; the liberated fatty acids, rising to the surface, are removed and washed with diluted sulphuric acid and afterwards with water, and finally the fluid oleic acid is forced out by powerful hydraulic pressure. In moulding the stearic acid thus obtained, care has to be taken to regulate its temperature to prevent crystallisation. Stearic acid is also obtained from stearine by distillation under pressure of superheated steam.

'Belmont Sperm' candles are made chiefly from palmitic acid obtained from palmitin, the principal ingredient in Palm Oil (q. v.). A distinct method of treatment is followed in operating with palm oil. The fat is raised to a high temperature, mixed with one-twentieth of its weight of sulphuric acid; lime is added to neutralise the acid, and on distilling the product glycerine passes over first. Chinese vegetable tallow, obtained from the fruit of *Stillingia sebifera*, and Japanese vegetable wax, the produce of *Rhus succedanea*, are mainly composed of palmitin, and are imported into Britain in considerable quantities for candle-making.

'Composite' candles vary in composition. A beautiful transparent kind is made with nine-tenths of stearic acid and one-tenth of bees-wax; another variety is formed of the stearic acid of tallow with the stearine of cocoa-nut oil.

'Paraffin candles.—The manufacture of these candles is now carried on on a most extensive scale in many parts of the United Kingdom from paraffin, procured from bituminous shale, Rangoon petroleum, and other mineral substances. They are much in demand on account of their cheapness and the clearness and brilliancy of their light. The beautiful translucent 'Ozokerite' candles of Messrs Field & Co., Lambeth, introduced in 1870, are manufactured from refined paraffin obtained from Ozokerite. The same firm has recently introduced 'self-fitting' candles,

graduated and grooved at the lower end, adapted to fit any size of candlestick.

The largest C.-making works in the world are those of Price's Patent G. Co., Vauxhall, London.

Candleberry, Candleberry Myrtle, Wax-Tree, Wax-Myrtle, Tallow-Tree, or Baberry, names all applied to *Myrica cerifera*, a shrub, a native of the United States, belonging to the order *Myricaceæ*. The fruits—drupes, though generally called berries—when ripe are covered with a greenish-white wax, which is collected by boiling them and afterwards skimming it off the surface when melted. About four or five pounds weight of berries will yield a pound of wax, which is used chiefly in making candles, which yield a pleasant odour, but little light. Scented soap is also made from it. Candles are also manufactured from the wax of the fruits of *M. cordifolia*, the wax-shrub of the Cape of Good Hope.

Candle-Fish (*Thaleichthys pacificus*), a genus of Teleostean fishes belonging to the Salmon family (*Salmonidae*), and so named from the great amount of fatty or adipose tissue they contain. The C.-F. occurs off the Pacific coast of America, and does not appear to leave salt waters to spawn like its salmon allies. Its average size is that of a smelt or herring. The head is sharp; teeth are borne in the upper parts of the mouth only; the colour being greenish above and yellowish or greyish-yellow below. The flesh is eaten by the Indians, who, however, chiefly use the fish as a ready source for obtaining oil. Like the Shetlanders, who use the shell of the common whelk as a lamp, the Indians often use this fish to give light, by the simple process of drawing a pith wick through the oily body, and allowing the fish to burn away.

Candlemas, the festival of the Purification of the Virgin, is celebrated annually on the 2d of February. The popular name, 'Candle Mass,' is derived from the chief feature in the observance—the priest's blessing of the candles, which are afterwards carried in procession by the people. It is a principal feast in the Roman Catholic Church, and is still observed as a holiday by the Church of England. It has been conjectured that C. was substituted for an original heathen ceremony, the festival of Februs, which was accompanied by an offering of candles, and a lustration of the people. In the Christian observance, the lighting of candles is intended to commemorate the words of St Simeon, when he said that Christ was 'a light to lighten the Gentiles.' Hence C. is also sometimes called the Holiday of St Simeon.

In Scotland, C. is one of the four Term-Days (q. v.), and various popular superstitions and customs are associated with it. In most countries of Christendom, good weather at C. was believed to prognosticate a bad year, and *vice versa*. This notion is embodied in the Scottish quatrain—

'Gin Candlemas day be dry an' fair;
The half o' winter's to come an' mair;
Gin Candlemas day be wet and foul,
The half o' winter's gane at Yule.'

A football match, called *C. Ba'*, was formerly played through the streets of Scotch country towns on this day, and in some places this practice is still continued.

Candle-Nuts, the fruit of the candlenut-tree (*Aleurites triloba*), a species of the natural order *Euphorbiaceæ*, a native of the Society Islands, Moluccas, &c. The oil expressed from the seed is called *Kukui* or *Kekume*, and is largely employed as an artist's oil, and for other purposes. In its action it resembles castor oil.

Candlestick, an instrument for supporting a candle. The brass candlesticks now in common use may be traced back to the 15th c., when a fine kind of brass called *latten* was employed for like purposes. The spiked C., then in vogue, was in the following c. superseded by the prototype of the modern socket C. In churches, in mediæval times, the typical Paschal candle was often borne aloft in a C. of colossal proportions with rich ornamentation. The C. at Canterbury in the 15th c. weighed 300 lbs., and at Durham a large latten C. was decorated with figures of the Evangelists, knights, flying dragons, and other animals.

Candle-Tree (*Parmentiera cerifera*), a tree of the natural order *Crascentiaceæ*, the fruits of which are shaped like a candle (hence the name), and are devoured by cattle in the Isthmus of Panama.

Candlewood, a name applied in Jamaica to *Gomphia Guianensis*, also to *Sciadophyllum capitatum* and *Amyris balsamifera*, or the white and black C.

Can'dlish, Robert Smith, D.D., a Scottish divine and ecclesiastical leader, born at Edinburgh, March 23, 1807, educated at Glasgow University, and was for some time a private tutor at Eton. In 1828 he was licensed to preach by the Presbytery of Glasgow, and in 1831 was called to Bonhill. In 1834 he was transferred to St George's, Edinburgh, and subsequently took a powerful part in the discussion of the Church's 'spiritual independence.' By his attitude on this question he forfeited an appointment to the newly instituted chair of Biblical Criticism in Edinburgh University. His nimble intellect, fiery eloquence, and restless energy found, however, a more appropriate sphere of activity in the non-intrusion controversy. All through his public career, from its commencement to its close, he was distinguished alike for his rapid dexterity of argument and great business capacity. 'The first effort,' says Dr Buchanan, 'found him abreast of the most practised and powerful orators, and as much at home in the management of affairs as those who had made this the study of their life.' A strict Calvinist in doctrine, his preaching was at once fervent and subtle. In 1861 he was elected Moderator of the Free Church Assembly, and in the following year was appointed Principal of the Edinburgh New College. He died 19th October 1873. C.'s principal writings, which are more or less of a popular character, are *Contributions towards the Exposition of the Book of Genesis, Life in a Risen Saviour, The Fatherhood of God, and Scripture Characters and Miscellanies*.

Can'dys, a Greek word meaning a loose woollen upper garment with wide sleeves, worn by the ancient Medes and Persians, and similar to a gown still worn by Turks and Arabians. It was always dyed in some brilliant colour, such as purple.

Can'dy-Sugar is sugar crystallised in sticks from its strong solution. The crystals are usually clustered around bits of twine or thin slips of wood. The name is probably derived from the island of *Candia*. At any rate, *kand* is the Turkish name for sugar of every kind.

Can'dy-tuft, the gardener's name for various species of *Iberis* (natural order *Cruciferae*), chiefly natives of the Mediterranean countries. *I. umbella* is the white and purple C., *I. odorata* the sweet-scented C., and *I. sempervirens* and *I. semperflorens* are two semi-shrubby species; all are common garden plants.

Cane, a commercial name applied to any smooth, more or less flexible, rod of wood about the thickness of a walking-stick, though generally applied to thin palms, &c. The following are among the more common species to which the term C. is applied:—Bamboo C. (*Bambusa arundinacea*, q. v.), dumb C. (*Dieffenbachia seguina*), great rattan (*Calamus rudentum*), ground rattan (*Rhapis flabelliformis*), Malacca C. (*Calamus scipionum*), Rattan (q. v.) (*Calamus Rotang*, C. *Royleanus*, C. *Roxburghii*, &c.), sweet C. (*Andropogon Calamus aromaticus*, q. v.), Sugar C. (q. v.) (*Saccharum officinarum*), Tobago C. (*Bactris Minor*, stems used for making walking-sticks), Imphee C. (*Sorghum saccharatum*, q. v.), snake-C. (*Kunthia montana*), Whangee C. (*Phyllostachys nigra*), wild C. (*Arundo occidentalis* and *A. saccharoides*), &c.

Canea, or **Cana** (the ancient *Cydonia*, mod. Gr. *Khania*, Turk. *Hanie*), is the capital of the island of Crete or *Candia*, lies on the N. coast, and has an active export trade in olive oil, Valonea nuts, locust beans, silk cocoons, &c. It is the residence of a Greek bishop, and of the governor of the island, of which it is the principal haven. Greek is the dominant language. Pop. 12,000. The present town was built by a Venetian colony in 1252, during the Latin rule at Constantinople (see *BYZANTINE EMPIRE*), and was fortified with the view of keeping in check the mutinous Greeks.

Cane-Brake, an American term applied to *Arundinaria macrosperma*, a grass which grows in marshy places in the warmer portions of the United States.

Canell's Bark has been confounded with Winter's bark, hence it is sometimes called *spurious Winter's bark*. It is a native of the W. Indies. The bark is pale-orange coloured, with an aromatic odour, and is used as a tonic, and in America

as an anti-scorbutic. Among the W. India negroes, and also in some portions of Europe, it is used as a spice. It yields a volatile oil which is sometimes mixed with or substituted for oil of cloves. In commerce it is known as *wild* or *white cinnamon*, or *white-wood bark*, and is exported from the Bahamas.

Canella, *oese*, a natural order of Dicotyledonous plants, containing only three species, natives of the W. Indies and the adjoining continent of America. They are aromatic, stimulant, and tonic. *Canella alba*, the laurel-leaved C., or wild cinnamon, &c. *Cinnamodendron axillare*, *C. corticosum*, a native of Jamaica, &c., have also aromatic bark similar in properties to *C. alba*. *C. corticosum* yields 'Winter's bark' as now found in commerce.

Cane-Sugar. See SUGAR.

Canes Venatici ('the hounds'), a constellation in the northern hemisphere, added by Hevelius, who named the two dogs which represent it Asterion and Chara.

Cang, or **Canque**, called also **Kea**, a Chinese instrument of punishment, consisting of a wooden collar of from fifty to sixty pounds weight, which is fixed round the neck of the culprit, who is first marched through certain streets by the police, and then left exposed in some public place. The term of his sentence, which sometimes extends to fifteen days, is written on slips of paper, pasted up on the parts to which the C. is fastened, and sealed by the mandarin, so that no one dares to relieve him till the time has expired. Meanwhile the prisoner has to be fed by others, as he cannot use his hands.

Can'gas de O'nis, a town of Spain, province of Oviedo (Old Asturias), 35 miles E. of the town of Oviedo. Pop. 7000. Near it is the cave where, according to Spanish legend, Pelayo hid after his defeat by the Arabs in 711 at Guadelete, and whence he issued seven years later, and completely vanquished his conquerors.

Canicatt'i, a well-built town of Sicily, province of Girgenti, on the Naro, 15 miles N.E. of the town of Girgenti. There are sulphur mines in its neighbourhood. Pop. (1871) 20,908.

Canic'ular Days, or **Dog Days**, the name given to certain days of the year, which are usually set down as beginning on July 3 and ending on August 11, and which are characterised by excessive sultry heat. In the time of the ancient astronomers, the heliacal rising of Sirius, the Dog-star (hence the name), occurred in the beginning of July, and to it all the disagreeable accompaniments of hot weather were superstitiously ascribed.

Can'idæ, the *dog* family of the *Carnivorous* order of mammalia; represented also by the wolves, foxes, and jackals. The family is distinguished by its members possessing pointed muzzles, smooth tongues, and claws incapable of retraction as in the Felidæ or cats. The front feet are five-toed, the hind feet being four-toed. The molar teeth may number $\frac{6-6}{7-7}$ or $\frac{7-7}{7-7}$, and two or three on each side of each jaw are tuberculate. The 600

caninid or flesh teeth possess large processes. The diet of these animals is less wholly or particularly *carnivorous* than in the Felidæ. (See also DOG, FOX, JACKAL, WOLF, &c.).

Can's Major and Minor, two contiguous constellations, the former in the southern, and the latter in the northern hemisphere. They contain respectively the bright conspicuous stars, Sirius (q. v.) and Procyon (q. v.), and may be found by means of these.

Can'ister Shot. See CASE SHOT.

Can'ker, a disease resulting in the slow decay of trees attacked by it. It is a kind of gangrene, proceeding from the roots slowly upward, and killing the tree in the course of a few years. It is especially fatal to fruit trees. Wet soils are inductive of C., and it also attacks twigs injured by frost. It is of various kinds, and the same tree may exhibit several different kinds of C. The woolly aphid, the development of bundles of adventitious roots, &c., may be all seen at one and the same time on the same plant. Trees long propagated by grafting are liable to it. The C. of the plum and the apricot are brought on by 'gumming.' Mr Berkley thinks that in many cases C. arises from the roots of the tree 'penetrating into uncongenial soil, which vitiates the juices, and induces death to the weaker cells, from which it spreads to the surrounding tissues; the rugged appearance being due to a struggle between the vital powers of the plant and the diseased action.'

Canker, a disease observed in the foot of horses, and characterised by a purulent discharge from the 'frog' or 'heels,' by ulceration and disintegration of the hoof and other structures of the foot, and latterly by the presence of raw and bleeding granulations. The exact nature of this affection still forms a subject of dispute amongst veterinarians; but the appearances and symptoms would lead the pathologist to refer it to the class of ulcerative and inflammatory affections, with probably a tendency in some constitutions to merge into a cancerous type. Sometimes the disease appears to be congenital in its nature, and the latter fact would seem to favour the idea of its cancerous nature or relations. It is caused by whatever tends to lower the system of the horse, by cold and damp; or it may (although more rarely) appear after some injury to the foot. Low-bred horses appear to be mostly subject to this disease. The *treatment* consists in that adopted for the cure of ordinary ulceration. The parts affected are to be pared away or to be removed by caustics. Pressure and protection by means of pads of tow are to be applied to restrain the process of granulation. Purgatives are to be administered, and during convalescence, good feeding, pure air and exercise, are recommended.

Cann'a, an islet in the group of the Hebrides, included in Argyleshire, with a pop. (1871) of 48. It lies 7 miles S.W. of Skye, and extends from E. to W.; is 1 mile broad, and $4\frac{1}{2}$ miles long. It rises high above the sea, is mainly formed of trap, and has a basaltic eminence, Compass Hill, so called because it reverses the magnetic needle.

